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THIS WEEK'S NEWS

AN EXHIBITION of architecture through the ages and two architectural competitions are being organised by the Royal Society of Ulster Architects as a contribution to the Festival of Britain in Northern Ireland. p. 508

THE VIEW that the use of new ideas, new materials and planning economies, such as reductions in circulation space, floor areas and so on, in the hands of architects could still produce considerable economies in building and at the same time provide sound, satisfactory, workable homes of pleasing design at very low cost was expressed by Major G. B. Cox, F.R.I.B.A., President, Birmingham and Five Counties A.A., when he opened "The Builder" Exhibition in Birmingham on April 9. p. 510

DETAILS of the arrangements in connection with the British Architects' Conference, which is to be held in Belfast from May 30 to June 2, have been announced by the R.I.B.A. p. 524

IT IS THE VIEW of the Housing Centre Trust that every effort must be made to avoid a reduction in the number of new dwellings to be erected but that their size and standard should be more closely related to the needs of the tenants. p. 531

EXAMINATION of the supply of cast-iron rainwater goods by the Monopolies and Restrictive Practices Commission has led the Commission to conclude that both the manufacturing members of the British Ironfounders' Association and most of the merchants handling these goods so conduct their efforts as to restrict competition in connection with the supply of rainwater goods. A summary of the Commission's report and the views of the Trade are given on p. 532

THE IMPACT OF DEFENCE

ACCORDING to the Government's Economic Survey the volume of building output for the next 12 months will be much the same as for last year. The expenditure on works and buildings for the services and civil defence will, however, rise from about £35m. in 1950 to £80m. in 1951. In addition, investment as defined in the Survey includes a great deal of building that is directly related to defence production—work both on private factories and on the Royal Ordnance factories and other Government-owned establishments; it is clear therefore that there will be a reduction in the amount of building resources available for ordinary civil purposes.

By the system of licensing and other authorisations the Government can control the use of building resources. As planning must precede execution by many months, the investment programme for 1951 was prepared and much of it was licensed and even started last year. This of itself would prevent any immediate drastic change. The programme of civil investment building is, however, being overhauled, for in building as in other national activities, defence must come first. Nevertheless it is not proposed to reduce the housing programme as a whole, although there may be some interference with local housing programmes.

It would not only be good news to the building industry but it would be sound economic sense if there were also to be a change of emphasis from local authority housing to private enterprise. There is according to the Economic Survey "a serious shortage of architects, quantity surveyors, craftsmen and other works staff, and defence building is likely to interfere with civil work by making claims on these particular skills." There is, in fact, a large source of supply of these so-called scarcity skills which could and should be tapped at once if adequate progress is to be made with the defence building programme. This source of supply is to be found in the architects' offices attached to every housing authority in the country. Part of these staffs could be released at once and there could be progressive implementation by transfer at later stages as the defence programme develops. Such transfer would follow automatically if a substantial proportion of the current programme of house building were changed over from the contracting to the house building industry. Simultaneously there would be an immediate reduction in the amount of Government and Local Authority borrowing for housing purposes and a welcome relief to the Chancellor of the Exchequer and the local ratepayer. That the housing investment programme would not suffer is proved by the continuing boom in building society finance. According to figures just published the total assets of building societies have increased from £1,142m. in 1949 to £1,259m. in 1950. Such a changeover would encourage a departure from the standard and expensive 1,050 ft. super house and should result in more individual houses being built

and consequently more families being satisfied. Here is a change which we hope the Minister of Local Government and Planning will grasp.

"Materials supplies should be sufficient in 1951 to enable building output to go on rising at least as fast as in recent years," but already we know that defence demands will make inroads on certain scarce materials. There is therefore an opportunity for manufacturers, aided by industrial and scientific research, to find and produce acceptable substitutes for these scarce materials. Progress in this direction is necessarily slow and is hampered by the rigidity of building bye-laws. The need is however great and the most should be made of the present opportunity.

"DESIGN FOR SANATORIA"

FOR the comparative few—the sufferers and friends of sufferers of tuberculosis—the National Association for the Prevention of Tuberculosis is a fairy godmother, an almost divine and provident Association whose aims provide for the care and well-being of such patients. For the many, the N.A.P.T. is just another association, but all will agree with the wisdom of this body in the timely production of the report by its Architectural Committee now published in booklet form with the title "Design for Sanatoria," and most will approve the aims and objects of its contents.*

The report aims at bringing together the opinions of experts about the design and the construction of sanatoria and chest hospitals, in the hope that, if the basic ideas of sanatorium care are properly understood, the structure which is built on such foundations will fulfil its requirements whatever differences there may be in detail. With great simplicity and due regard to economy in words, guidance has been given on the design of sanatoria in some 40 chapters divided into 214 sections. The site, size, structure, constructional details, details of ancillary departments and equipment of sanatoria and a section on the design especially related to tropical and sub-tropical climatic conditions are covered in this text.

We are warned in the foreword that in matters of detail conflicting advice may appear to be given, and a special and very worthy note condemning the adaptation of large houses for the special functions of sanatoria, should provide a warning with sufficient weight of testimony to prevent well-disposed but ignorant bodies using this uneconomic expedient of providing accommodation for patients.

Excellent though this booklet is, it is severely limited. It is, as the Association claims, a catalogue of ideas generally agreed as being necessary to incorporate in the design of a modern sanatorium. It does not solve any of the major controversial issues which confront the planners of sanatoria. It may be that in seeking an agreed formula with a committee it is necessary to avoid the controversial issues which one would have liked to have seen brought out more into the open and the different points of view concerning these issues placed side by side.

The provision of buildings will in the future be the responsibility of the Minister of Health under the National Health Act, and it is presumed that a more direct lead will be given on the standards of accommodation and the actual establishment of a sanatorium in a given locality; and if based on the ideas contained in this new report there is new hope for a rational building based on actual requirements. What more remains? Can maxima and minima standards be stated which take account of efficiency and economy? Take for example a sanatorium for between 200 and 240 patients. How should this be subdivided? Into what groups, male and female? What is the most desirable social grouping for patients living together for long periods? These questions are surely ones outside the capacity of a voluntary committee, and require teams of experts working at them over a long period and, furthermore, given time to establish such data.

No matter how good the reports may be, unhappilythey do not benefit patients suffering from tuberculosis now, and the thought that in another ten years' time we shall know how to build a new sanatorium is of little consolation to them. The most deserving outcome of this report would be that the Ministry of Health would commission at least one sanatorium built on the framework of these ideas, so that they could be tested under the only satisfactory conditions—those of actual experience. It is at least ten years since a new sanatorium was built in this country and even if a decision were taken to-morrow to build a new one, it would be several years before the results of such an experiment could be properly formulated.

From the architect's and the builder's point of view, this problem, in common with that of building new hospitals, is how to provide this highly technical accommodation at a very low price in such a flexible manner that it can be changed as the special requirements vary. This has not yet been achieved in any field of building activity, and remains a major problem of our time. The nearest parallel to the achievement of reasonable standards with some regard to economy is in schools and housing programmes. Why is this so? Not solely because of the many excellent reports published about them, but because examples have been built competing with one another to establish better standards and greater economy, under the present difficult conditions of conflicting priorities and shortages. If the provision of proper facilities now meant the virtual eradication of tuberculosis in a generation or two, surely it would be wise government to make further sacrifices in the interest of public health and to provide these facilities for the prevention of tuberculosis as one of the most urgent priorities—even one might say at the expense of building fewer Government offices.

WATERLOO ROUNDABOUT

WHEN the plans for road improvements in connection with the South Bank Exhibition were issued we suggested that the roundabouts proposed at the "east" and "west" ends of York-road were not as good as they might have been. Although apparently efficient for their purpose, they were clearly capable of improvement from the town planning point of view. We criticised particularly the spur roads connecting York-road with Waterloo-road and the bridge approach because of (*a*) their awkwardness, and (*b*) the triangular islands of old property which were left here, exposing shabby and shapeless backs to the new roads; and we suggested that a complete clearance should be made to allow of a fine new open space, much needed in this part of South London in view of the district's greatly increased importance. The reply was that this particular improvement was a temporary one, made for the sole purpose of improving traffic conditions for the Festival of Britain, and that it was unfair to judge it as though it were an example of permanent planning.

In our issue for March 30, we published some drawings of the shops which are now being built by the L.C.C. on the south-east spur of this roundabout. These, it is stated, have been designed for a life of about 21 years, so presumably the idea of revising this particular layout when the Festival is over has been abandoned. These new roads, it is clear, are not temporary, but intended to last for at least 21 years. Of course, it may yet be decided to clear away the decrepit-looking old buildings within the roundabout, but the resulting triangular open space —if it is allowed to remain as one—does not promise the dignity that one expects to find in a great Metropolitan improvement of the mid-twentieth century.

No doubt, when the Festival is over, the whole of this area will be very carefully studied with a view to providing a good permanent setting for the Concert Hall, the proposed National Theatre, the new Government offices and other buildings which are expected to be located here, but it now seems certain that the planners will be saddled with, and probably hindered by, this unfortunate roundabout.

* Report of the N.A.P.T. Architectural Committee. Published from Tavistock House North, London, W.C.1. Price, 12s. 6d. net.

NOTES AND NEWS

Renaissance at the V. and A.

STUDENTS of all ages would be well advised to visit the Victoria and Albert Museum to see the newly opened galleries devoted to the Renaissance period. Rarely has such a brilliant collection of architecture, sculpture and painting been brought together into one collection, and the museum authorities must be congratulated upon the finely designed backgrounds to the exhibits. Indeed, so cleverly has the exhibition been designed, that little hint is present of the traditional museum atmosphere.

As we have said, it is an exhibition of consummate art; the Sienese painters, the work of Della Robbia and Florentine goldsmith's all find their place. A complete fifteenth-century ceiling is to be seen, and also a finely carved sixteenth-century fireplace from Siena. The German Renaissance is also well represented, yet fine though the work is it merely serves to illustrate by contrast the genius of the Italian creative mind.

Leaving the galleries we had the feeling that we were leaving the actual countries conceived in the exhibition, a small but telling tribute to a memorable display.

Architectural Teachers' Conference

THE THIRD MEETING of the Architectural Teachers' Conference will be held on Saturday, April 28, next, in the Council Chamber at the R.I.B.A., Portland-place, W.1. The chair will be taken by Professor A. E. Richardson, R.A., M.A., F.S.A., F.R.I.B.A. In the morning a paper will be given on "The place and purpose of History and Theory of Architecture in the curriculum" and a further paper on "The approach to Science and Structural Mechanics in the Architects' training," will be given in the afternoon.

Builders in Armourers' Hall

IT WAS a happy thought of the officers of Central Area No. 3 of the London Master Builders' Association to hold their luncheon on Tuesday in the Hall of the ancient Armourers' and Brasiers' Company, the more particularly as it offered, in the words of Sir Harold Webbe, M.P., some bulwark against the impending doom of the Budget. This is the first occasion on which an Association branch has met in the hall of a City Livery Company, and the opportunity was much appreciated by the members and their guests. This beautiful small hall dates from 1839, and is to the design of John Henry Good, who built it for the sum of £10,535, including furniture. The Company received its first charter in 1453 from Henry VI, though it acquired its first hall in 1428.

Following the passing of the traditional loving cup came the speeches, which were brief but to the point. In responding for the guests, Sir Harold Webbe maintained the high oratorical tradition of the House and of the City, and Mr. Geo. L. Downing, Hackney Borough Engineer, created much merriment in his reply. Mr. D. E. Woodbine Parish, senior vice-president L.M.B.A., entered a timely plea that members should take away from the Hall a reminder of the City tradition that it was the bounden duty of masters to pass on to apprentices something of the arts and crafts they themselves had inherited. The chairman, Mr. B. L. Morgan, responded. All found themselves in agreement with Mr. R. H. Willard, who ably proposed the health of the guests, that the Area should arrange at least one annual function in a City Livery hall.

Bucks Society of Architects

ALL STUDENTS resident in Bucks, or working in the office of a member of the Bucks Society of Architects who practises in the county, are invited to submit work for the summer sketch club. Prizes of books will be awarded for sketching and measured drawings, and application to compete should be made by May 26.

A week-end course for students of the Bucks Society of Architects, also students resident in Bucks, Berks, Oxon, Northants, Beds and Hunts, is to be held at Missenden Abbey, Great Missenden, Bucks from 4 p.m., Friday, July 6, until Sunday, July 8, next. Accommodation is available for 35 students, and a full programme has been arranged. Applications should be made by June 3.

Further particulars can be obtained from, and applications should be sent to Mr. W. Leslie Jones, hon. secretary Bucks Society of Architects, 21, High-street, Great Missenden, Bucks.

Building and the Budget

THE DECISION of the Chancellor of the Exchequer, announced in his Budget speech on Tuesday, to increase the tax on petrol by 4½d. a gallon, coupled with the previously announced increase of 10 per cent. in freight charges, is expected to result in further increases in the cost of house and other building work. The Chancellor's decision that the initial allowances of 40 per cent. given for income tax and profits tax purposes on plant and machinery, and 10 per cent. on industrial buildings, must be suspended from April 6, 1952, is also expected to have its repercussions on the building industry.

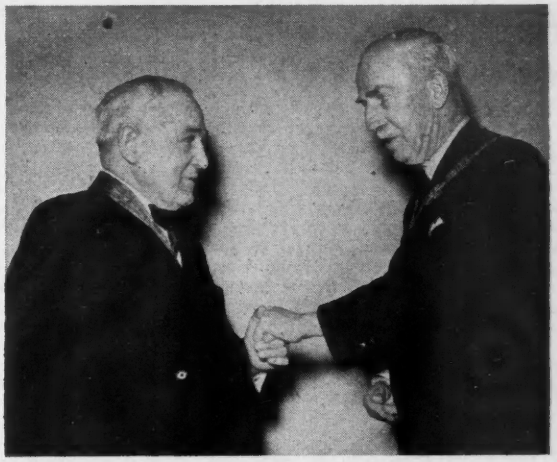
Georgian Group's Report

THE REPORT, published in June last by a committee headed by Sir Ernest Gowers, C.B.E., on "Houses of Historical or Architectural Interest," is referred to in the Interim Report, 1950, recently issued by the Georgian Group. While the Group will make it its business to urge the implementation of all the recommendations contained in the Gowers Report, it will press particularly for the carrying into effect of the recommendation that legislation dealing with ancient monuments and with historic buildings should be co-ordinated and consolidated, and that the administrative machinery should be simplified.

The Georgian Group expresses its disappointment that the Gowers Committee did not consider it possible to include in its terms of reference the study of the condition of interesting old churches, many of which, the Group points out, will become irreparable (except at prohibitive cost) unless arrangements are soon made for their proper restoration.

To Address L.M.B.A. Council

COUNCILLOR STEPHEN HUDSON, president of the N.F.B.T.E., is to address the next meeting of the L.M.B.A. Council on April 19.



ROYAL GOLD MEDAL AWARD. Seen above is Mr. E. Vincent Harris, R.A., O.B.E., F.R.I.B.A. (left) being presented at the R.I.B.A. on April 3 with the Royal Gold Medal. On the right is Mr. A. Graham Henderson, A.R.S.A., President. The proceedings were reported in our last issue

Professional Announcement

MESSRS. C. S. ALLOTT AND SON, consultant engineers, North-parade, St. Mary's Parsonage, Manchester, 3, inform us that as from April 1, they have taken into partnership MR. ARNOLD BAILEY, A.M.I.C.E., and MR. STANLEY GLEAVES, M.I.Struct.E.

COMING EVENTS

Friday, April 13

"THE BUILDER."—Exhibition of designs and models submitted in the £1,000 house competition. Exhibition Hall, Lewis's Store, 32, Bull-street, Birmingham. (Open until April 21, 9 a.m. to 5.30 p.m., Wednesday, 9 a.m. to 1 p.m., Saturdays, 9 a.m. to 6 p.m.)

Saturday, April 14

INSTITUTE OF QUANTITY SURVEYORS (MIDLANDS BRANCH).—Mr. J. C. Corrin on "Insurances in Relation to Forms of Building and Civil Engineering Contracts." White Horse Hotel, Congreve-street, Birmingham. 3 p.m.

Wednesday, April 18

TOWN AND COUNTRY PLANNING ASSOCIATION.—"Planning Rural China," by Mr. Julian Friedman. 28, King-street, Covent Garden, W.C.2. 6.15 p.m.

ROYAL SOCIETY OF ARTS.—"Electricity Supply in Great Britain To-day," by Sir John Hacking, R.S.A. John Adam-street, Adelphi, W.C.2. 2.30 p.m.

HOUSING CENTRE TRUST.—Tour of Harold Hill, L.C.C. estate. 13, Suffolk-street, S.W.1. 2 p.m.

BRITISH COLOUR COUNCIL.—A.G.M., 13, Portman-square, W. 3 p.m.

Thursday, April 19

SOCIETY OF CHEMICAL INDUSTRY.—"Problems Involved in Obtaining Colour and Texture in Concrete Surfaces," by Mr. J. G. Wilson. 11, Upper Belgrave-street, S.W.1. 6 p.m.

FROM "THE BUILDER" OF 1851

Saturday, April 12, 1851.

THICKNESS OF PARTY WALLS.—At the Birmingham County Court, on the 27th ult., an action was brought to recover 2*l.* 10s. as damages done to a garden by the fall of a party wall, this arising, as was alleged, from the insecure nature of its construction. Mr. Cutts, a respectable surveyor, had inspected the wall, which was, as so frequently occurs, but a 4½-in. erection, and, in his judgment, such walls were too slight for their purpose, however well they might be put together. After hearing, the judge said it was evident the wall was not sufficiently strong. Plaintiff would have a verdict for 30s., damages to garden.

Festival of Britain in Northern Ireland

ARCHITECTURAL EXHIBITION AND COMPETITIONS

AN exhibition of architecture through the ages and two architectural competitions are being organised by the Royal Society of Ulster Architects as a contribution to the Festival of Britain in Northern Ireland. In her cities and towns, villages and countryside, Ulster men and women are also planning many other local Festival exhibitions and celebrations. Some of the Northern Ireland Festival events are of more than local interest and will convey the attractive "colour" and personality of the region, as well as tell the story of its fine craftsmanship and remarkable industrial and agricultural achievement.

The chief Northern Ireland contribution to the official programme of the Festival is the Ulster farm and factory exhibition which is to be staged at Castlereagh, Belfast, from June 1 to August 31.

The exhibition displays the past and present of those industries in which the special skill and craftsmanship of Northern Ireland has become internationally known. It also displays the story of Northern Ireland's development of agriculture and of her important contribution to the kitchens of Britain. It will be staged in the interior and grounds of a modern factory on a Northern Ireland Government industrial estate at Castlereagh, Belfast. The factory, built by the Northern Ireland Government under its Industries Development Scheme, has been specially adapted for the exhibition.

The outdoor section will include a typical full-scale old Irish farmhouse of 1851 with flat roof, small windows, earthen floor, open fireplace, furniture of the period, old-time byre and stable, and a lean-to cart shed containing period farm instruments. Contrasting with this exhibit will be "a farm of the future," built to full size and working to capacity. It will be all-electric with an inter-com. system, undercover working, milk cows for Grade A milk production, livestock, a complete range of modern farming equipment and labour-saving devices, and a farmyard capable of extension without upsetting ease of access to any particular section. Living accommodation for the farmer and his family and farmhands will be provided on the first floor.

Architecture

The building chosen for the architectural exhibition is a bombed, one-storey, derelict structure on a blitzed site in the centre of Belfast. It will be cleaned up and its roof made watertight. In it will be told the story, by means of models, drawings and photographs, of architecture in general from the earliest days until the present. Modern architectural thought will be stressed. The two-fold theme of the exhibition will reveal the architect as the creator of environment and will also indicate stages in the development of architecture from cave dwellings to contemporary examples in conscious design. Harmony of architecture with the surroundings will have a leading place in the exhibition themes.

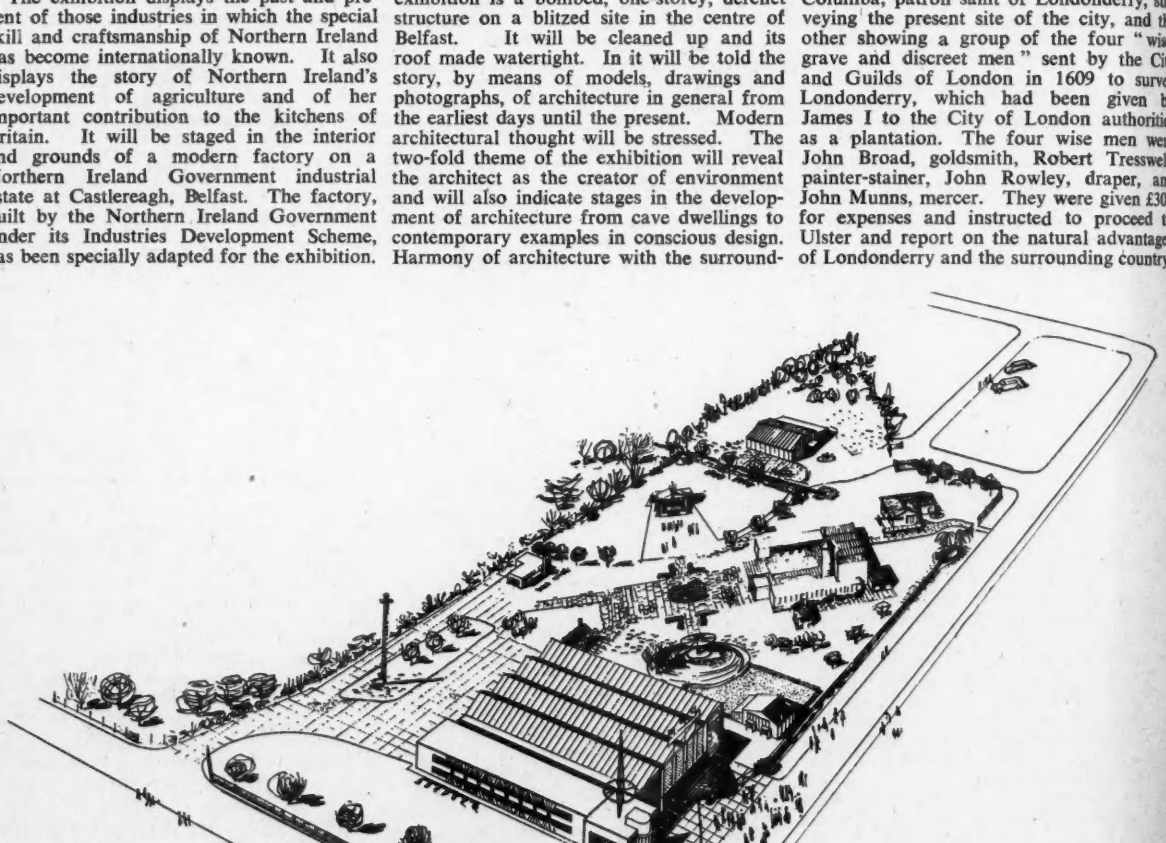
The exhibition may be seen from May 29 to July 28 in its building at the corner of Castle-street and Fountain-street, Belfast.

The competitions will be for designs suitable for a large seaside hotel on a site at Craigavad, near Belfast, and for a recreation centre for the town of Enniskillen, County Fermanagh. Both competitions are open to qualified Northern Ireland architects and to architectural students born or normally resident in Northern Ireland.

When the exhibition opens, the annual congress of the Royal Institute of British Architects will be taking place in Belfast.

Sculpture

George Galway MacCann, the Northern Ireland sculptor, has been commissioned to carve two tablets for the Londonderry Guildhall. The tablets, which will be placed in the entrance hall, will represent scenes from the history of Londonderry itself. Two subjects have been chosen, one showing Saint Columba, patron saint of Londonderry, surveying the present site of the city, and the other showing a group of the four "wise, grave and discreet men" sent by the City and Guilds of London in 1609 to survey Londonderry, which had been given by James I to the City of London authorities as a plantation. The four wise men were John Broad, goldsmith, Robert Tresswell, painter-stainer, John Rowley, draper, and John Munns, mercer. They were given £300 for expenses and instructed to proceed to Ulster and report on the natural advantages of Londonderry and the surrounding country-



Layout of Ulster farm and factory exhibition

side. Their report was favourable and so began the long association between the two cities.

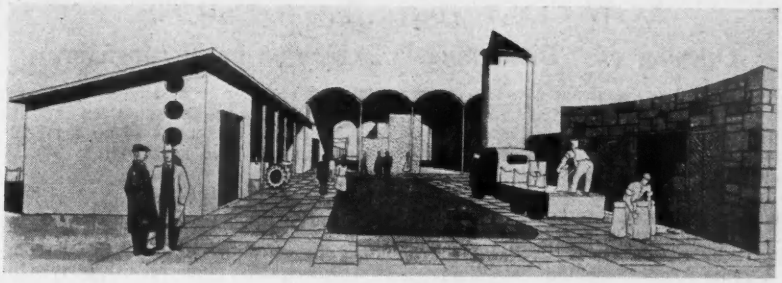
John Knox, another sculptor working in Northern Ireland, has been commissioned by the Ulster Savings Committee to carve a figure representing "Thrift." This figure will stand in the middle of the artificial lagoon which will be a feature of the grounds of the farm and factory exhibition.

Arts

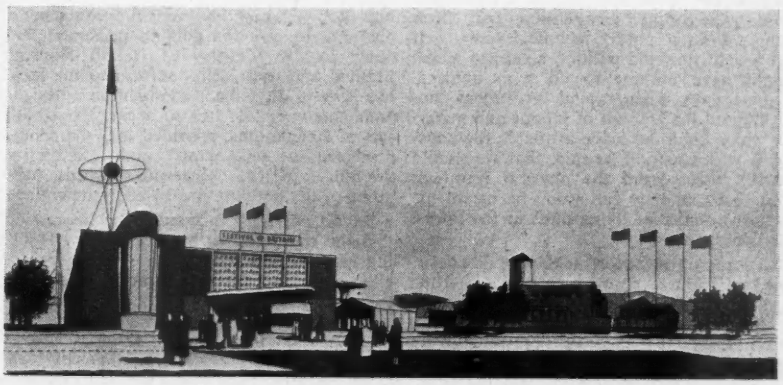
Northern Ireland has, for many years, had a school of virile and able painters, of which the late Sir John Lavery was, for long, the most famous. From May 3 to June 23 there will be an exhibition of Sir John Lavery's work, including many of his best portraits and other canvases. The exhibition will be housed in the Belfast Art Gallery and several galleries throughout the British Isles will be lending Lavery paintings for the occasion. It is hoped that Lavery's painting of Pavlova will be on show, together with his portrait of Winston Churchill. The latter portrait, it is hoped, will be hung side by side with Winston Churchill's portrait of Lavery.

Contemporary painting in Northern Ireland will be featured at the Belfast Art Gallery from June 13 to July 28. Among the artists whose work will be exhibited are William Connor and Frank McKelvey—representing the senior painters—and Alicia Boyle, William Scott, Colin Middleton, Dan O'Neill and John Luke of the younger generation.

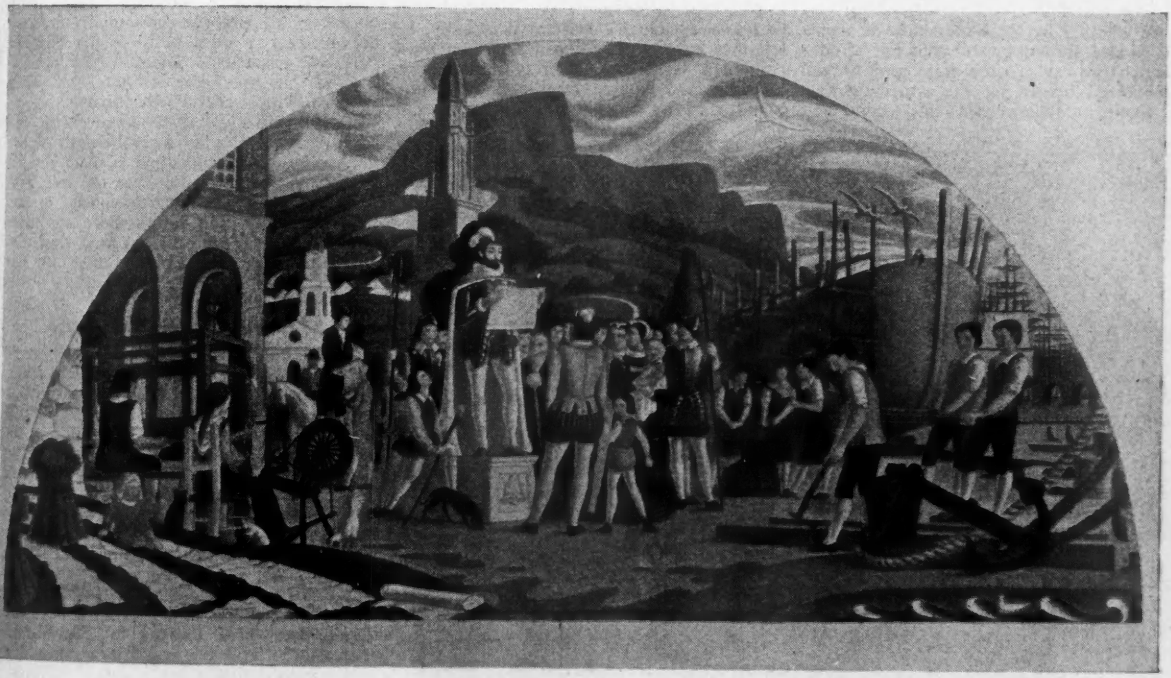
John Luke has been commissioned to paint, for the Belfast City Corporation, a large mural representing the life and history of Belfast. He is now at work on this commission and the mural is taking shape on the lunette above the entrance door to the reception room at the City Hall.



Modern farm building



Farm and factory exhibition building



Mr. John Luke, the Ulster artist, has desinged this mural for the Northern Ireland Festival. The subject is a representation of the life and history of Belfast. In the central group Sir Arthur Chichester, to whom Belfast was presented in 1603, is seen reading the Charter of the town to a gathering of citizens. The painting symbolises the beginnings of Belfast's industries, notably linen, shipbuilding, rope making and metal working. The religious life of the town is represented by old St. Anne's church, and a representation of Cavehill forms the background. The mural has been offered to the Belfast Corporation by C.E.M.A. and has been accepted. The artist is now at work on the painting of the mural in the City Hall

LOW-COST HOUSING DESIGNS

Opening of "The Builder" Exhibition in Birmingham

THE view that the use of new ideas, new materials and planning economies, such as reductions in circulation space, floor areas and so on, in the hands of architects could still produce considerable economies in building and at the same time provide sound, satisfactory, workable homes of pleasing design at very low cost was expressed by MAJOR G. B. COX, F.R.I.B.A. (President, Birmingham and Five Counties A.A.), when he opened, on Monday, an exhibition of designs and models submitted in *The Builder* Low-cost Housing Competition at Lewis's Store, 32, Bull-street, Birmingham.

Introducing the President, MR. IAN M. LESLIE, J.P., Hon.A.R.I.B.A. (Editor, *The Builder*) said the competition had been organised on a purely technical basis. It had sought to avoid politics, a subject which should have nothing to do with housing. In these days, when capital investment control limited the amount of labour and materials which could be made available for housing, it was essential, he said, that we should get full value from the physical resources open to us, and by full value he meant the greatest number of living units at the lowest possible rents.

"Two main means of achieving this desirable end seem to be open to us," added the speaker. "The first is to make greater use of the organised house-building industry which at present is effectively prevented from making its contribution by virtue of the 1:4 licence ratio; this ratio, and the licensing system, prevent the deploying in economic units of an industry which, between the wars, built nearly three million houses.

"The second means of increasing the numbers of houses is to look more closely at the houses that are at present being built to see whether by some reduction of standards of size and equipment (but not of construction) we can provide more comfortable, well planned houses for the same materials and money. It is towards this second step that *The Builder* competition has been directed, and the designs submitted indicate the high degree of success which the competing architects have achieved."

Successful Solutions

MAJOR COX said: "Planning a small family house, designed to provide a comfortable, workable home for five persons, to be built at a very low cost, is a most difficult and complicated operation.

"In spite of these difficulties a number of successful solutions have been found—they might almost be described as miracles of planning—and your next thought will be, how was it done? Normal housing scheme planning follows the guiding principles laid down in the Ministry of Health Housing Manual and must also conform to the local bye-laws. In the competition designs architects were left free to depart from both sets of Regulations, provided that the results produced a satisfactory and economical dwelling. In the housewife's words 'the proof of the pudding was to be in the eating.'

"I do not wish to convey the impression that the standards set by the Ministry Housing Manual and bye-laws are wrong or are extravagant but the designs produced do indicate that given new ideas, use of new materials, planning economies such as reductions in circulation space and floor areas and so on in the hands of architects, aided by technical research and skill, can still produce considerable economies in building and at the same time provide sound, satisfactory, workable homes, of pleasing design at very low cost."

Emigration might be the answer to some of our problems, Major Cox continued, but that was outside his brief. Personally, he felt that every future housing scheme must contain a large proportion of multi-storey, self-contained flats or dwellings. Our tiny island with its huge population could not possibly afford the areas of land required to build two-storey semi-detached or terrace housing with a low density of 12-14 to the acre. Agricultural land must be preserved for food production at all costs. Our nation, to-day, was trying to feed 40 million souls on the same area of land that 150 years ago supported some seven to eight million people, and yet every year we recklessly reduced our agricultural food growing areas for building, as though our supply of land were inexhaustible.

In declaring the exhibition open, Major Cox congratulated the Editor and Proprietors of *The Builder* upon their vision and enterprise in first of all promoting the competition and secondly upon their kindness in arranging, with Messrs. Lewis's co-operation, the exhibition which was such a valuable contribution to the housing problem.

Need for Care in Planning

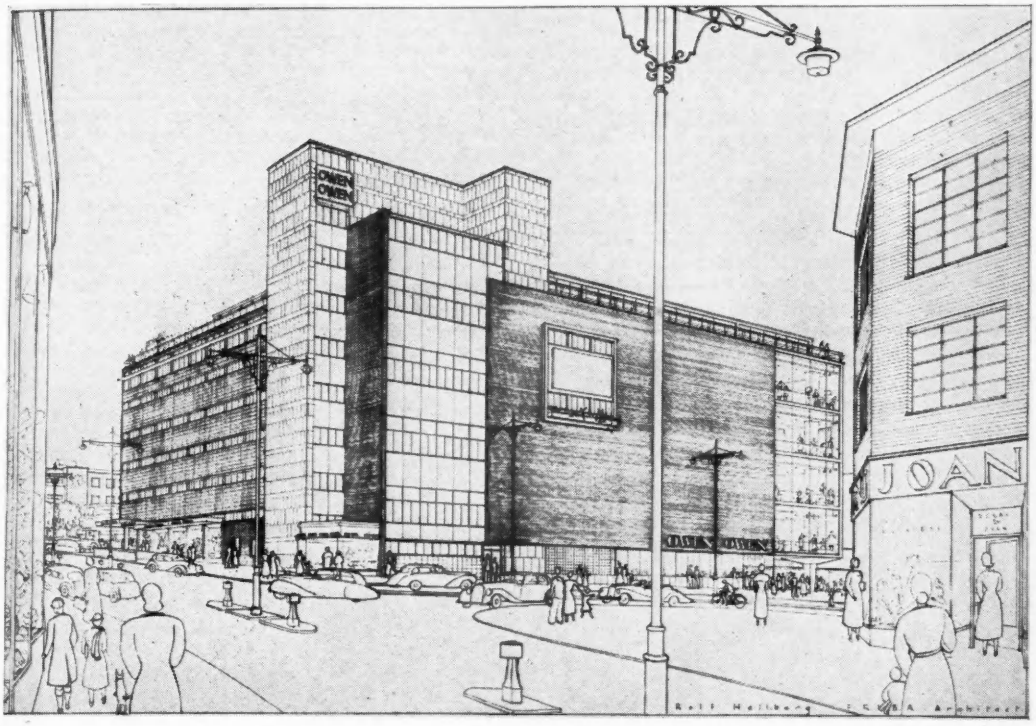
MR. HERBERT J. MANZONI, C.B.E., M.Inst.C.E. (City Engineer and Surveyor, Birmingham), proposing a vote of thanks to Major Cox, said: "At first sight one would be apt to say that it is very easy to cut down the cost of the house, and indeed to produce more houses, by reducing the superficial area but in fact that process is usually very uneconomic because a one-bedroom house is normally more costly per super ft. than one having two bedrooms, and a two-bedroom house than one with three bedrooms, the reason being that each has to have similar services—each needs a kitchen, domestic offices, hot water supply, and all the other amenities, and these things cost very nearly as much for the smaller house as they do for the larger. But the real achievement in the case of the winning competition design is that by a careful re-arrangement of planning the living-rooms and bedrooms are reduced only very slightly or not at all and the economy is made in the unessential parts such as the entrance hall and passages." There was a possible criticism in the long frontage of these designs, which added considerably to the cost of roadworks but to some extent that could be overcome by careful design of lay-out, although it remained a real danger. "There is an impression that the last word in small house planning has been spoken but this competition shows there are many young architects who do not hold that view and who are willing to adventure into new fields.

Amenities and Standards

"This question of amenities and standards is a very vital one at the present time," Mr. Manzoni went on. "The view has been expressed that we are no longer a wealthy country but in the matter of building, and particularly in the matter of house building, I think the cutting of standards is wrong because our homes are the things which largely shape the mind and character of future generations and which contribute very largely to our present happiness. For that reason I am apt to be rather critical of any reduction in size, standards or amenities of dwelling-houses and it is only because I think that these designs in *The Builder* competition have retained a large amount of the standard and amenity of the Housing Manual that I consider them worthy of much praise."

* * The exhibition remains open in the Exhibition Hall, Lewis's Store, 32, Bull-street, Birmingham, until Saturday, April 21 (daily 9-5.30, Saturdays 9-6 and Wednesday 9-1).

"THE BUILDER" EXHIBITION AT BIRMINGHAM. Seen above are Major G. B. Cox (President, Birmingham and Five Counties A.A.) who opened the exhibition of designs from "The Builder" Low-cost Housing Competition at Lewis's Store, Birmingham, on Monday. On his left are Mr. H. J. Manzoni, C.B.E., and Mr. Ian M. Leslie, Hon.A.R.I.B.A.



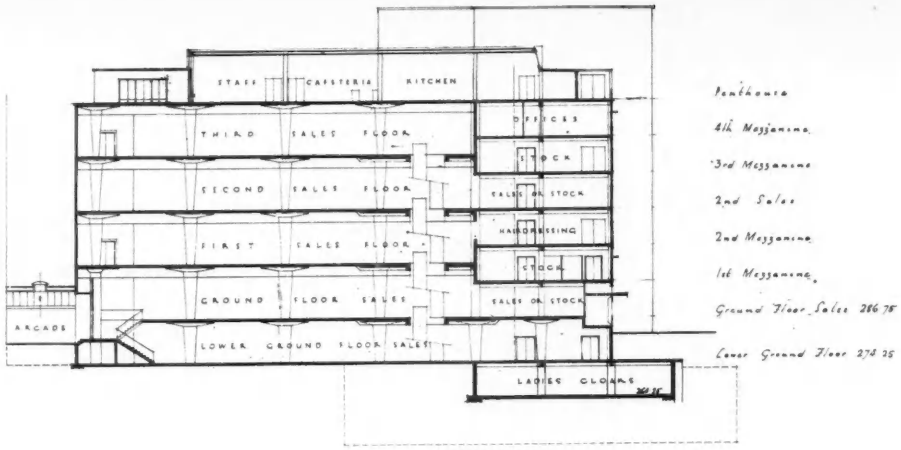
View of north and east elevations

THE NEW OWEN OWEN

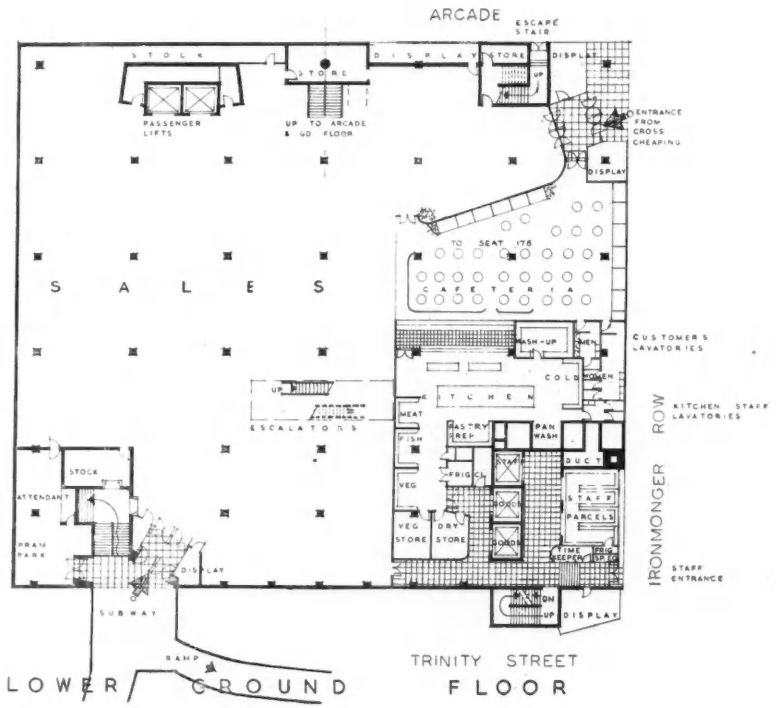
DEPARTMENT STORE, BROADGATE, COVENTRY

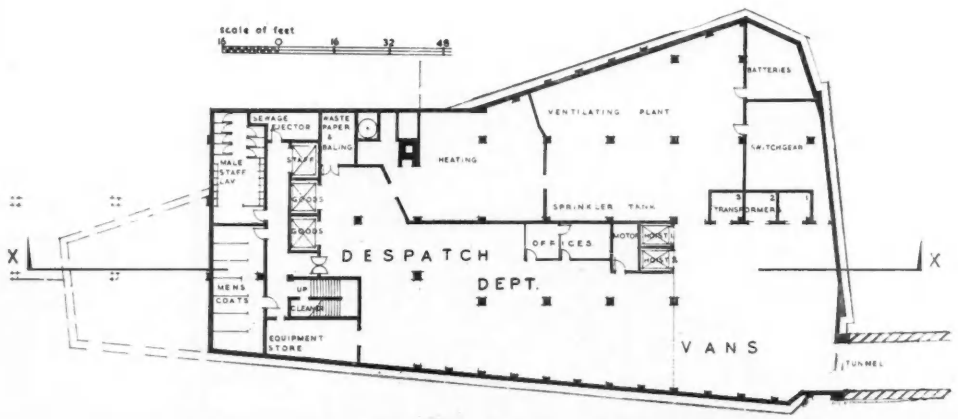
ROLF HELLBERG, F.R.I.B.A., ARCHITECT

The new store in relation to Broadgate



Cross section





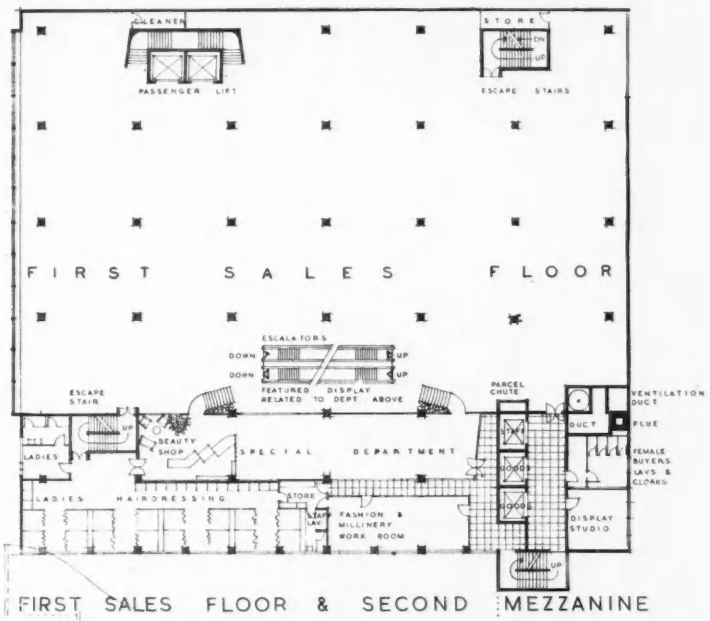
Sub-basement plan. (This is practically outside the building proper)

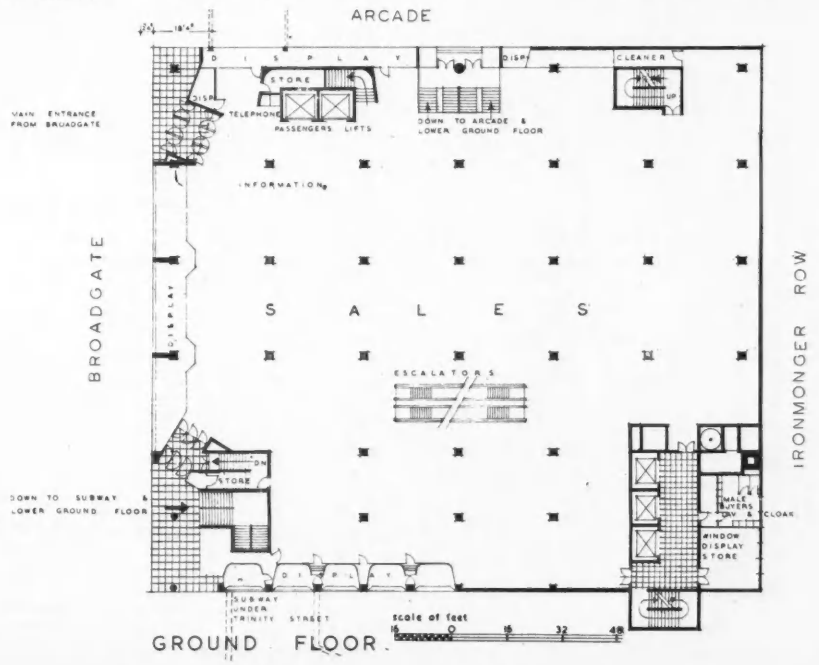
CONSTRUCTION work is now commencing on block H of the Coventry Reconstruction Scheme, the new Owen Owen department store, which will replace the building demolished during the last war and which now only exists as a huge hole to the north of Broadgate. This building, which has many new features, should, when complete, be one of the finest department stores in the country, and certainly one of the most revolutionary. It will be roughly square in shape and will fill the north side of Broadgate and cover the present street of Cross Cheaping. The layout is unusual in several respects. The basement and sub-basement, which contain the receiving and despatch rooms and all the engineering plant rooms, are practically entirely outside the building proper and will be covered by a double carriageway linking the Burges to Trinity - street.

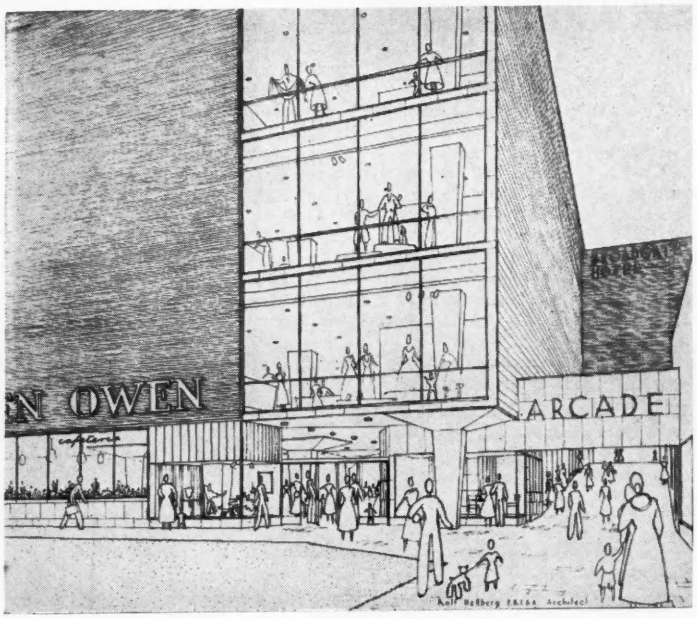
The building above Broadgate level is really two buildings in one, a long narrow stock and office block on the Trinity-street frontage alongside the broad sales block which fills most of the site. The sales block has four floors and the stock block six of the same height, with a lower ground floor extending under both blocks. Due to the fall in ground levels between Broadgate and the Burges, the store has two ground floors, the upper entered from Broadgate near the top of the proposed arcade, the lower from the Burges at the bottom of the arcade. There is a half-level entrance leading to both floors from the middle of the arcade. Stairs to the pedestrian subway, now under construction, are being provided in the building at the Trinity-street end of the Broadgate front, and there are secondary entrances to the two lowest sales floors at the head and foot of these stairs, the latter being in the subway itself.

External Appearance.—The building has been designed to be equally attractive and striking by day and by night. It is perhaps the first building in the world to be conceived with "discontinuous" elevations in permanent contrasting colours and textures changing from façade to façade. *Broadgate front.*—The Broadgate front has an American type visual entrance allowing the shopper a complete view of the ground floor sales area from outside. Non-reflecting windows of a new type, using only flat plate glass, are used all along this front and displays may be closed at the back or left open to allow a view of the sales floor. A low metal canopy will shield shoppers from inclement weather. Above the canopy an enormous window, over 100 ft. long by over 40 ft. in height, projects from a frame of Travertine marble. The window is double, having an inner face, 18 in. behind the outer face. Hidden floodlights in the windows will light the whole window area as a great glowing rectangle by night. On the roof four curving arches of shell concrete, with almost invisible supports, cover the restaurant, and when lit from below at night will appear to hang in the sky. Over 90 ft. above pavement levels, a square lift tower of fluted concrete rises above the roof gardens and restaurants.

On the Trinity-street frontage long strips of continuous high-level windows, lighting the stock floors, are set in a







Lower ground floor entrance, north façade and arcade from Cross Cheaping

South front and main entrance from Broadgate to upper ground floor

curtain wall of salmon pink deeply fluted terracotta, which will contrast with the green Hornton stone plating the sheer walls of the service lift tower. On the north side, which faces the present Ironmonger-row, the façade is mostly brick, the whole central area being an almost windowless wall over 60 ft. high and 80 ft. long. Above the main entrance in the north-west corner and facing anyone approaching from the Burges the wall is completely removed and fully glazed to show a complete section of the building from top to bottom.

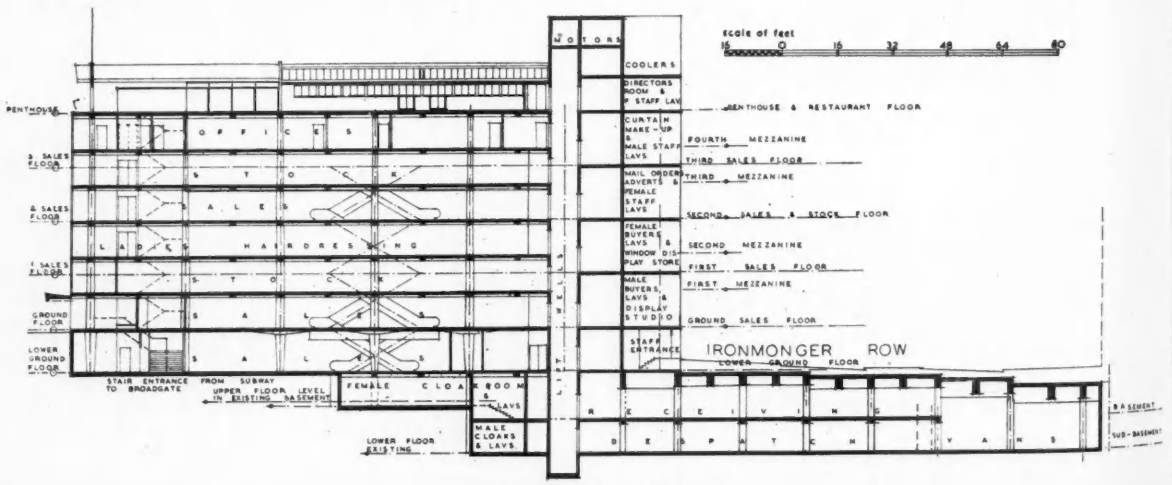
Construction.—The building structure is reinforced concrete throughout, the sales block being mushroom construction. This form of construction, peculiar to concrete, may be compared to a series of one-legged tables standing side by side with edges touching and superimposed on each other also. In this case the columns and tables are of square tapering form, and should appear much more graceful than the usual cylindrical and conical forms. The reinforced concrete work is being designed by Messrs. Scott and Wilson.

Internal Layout.—All the five sales floors will be served by lifts and escalators. The elaborate air-conditioning, ventilating and heating plant is designed by Messrs. Roger Preston and Partners. The lighting and colour schemes will change from floor to floor and department to department, according to the type of merchandise, to produce variety and interest for the shopper.

Restaurants.—There will be a large cafeteria on the north front of the lower ground floor. The main restaurant lies on the roof and is approached through a spacious coffee lounge.

The whole scheme will cost £600,000. Bovis, Ltd., of London, are the general contractors.

The following sub-contracts have been placed:—Lifts and escalators: J. and E. Hall, Ltd.; sprinkler equipment: Atlas Sprinkler Co., Ltd.; sewage lifting pumps and cast iron drainage: Burn Bros.



Longitudinal section

General view of south elevation showing how the new building joins the old

WITHERSDANE HALL, WYE COLLEGE, KENT

RICHARD SHEPPARD AND PARTNERS, F. & AA.R.I.B.A., ARCHITECTS

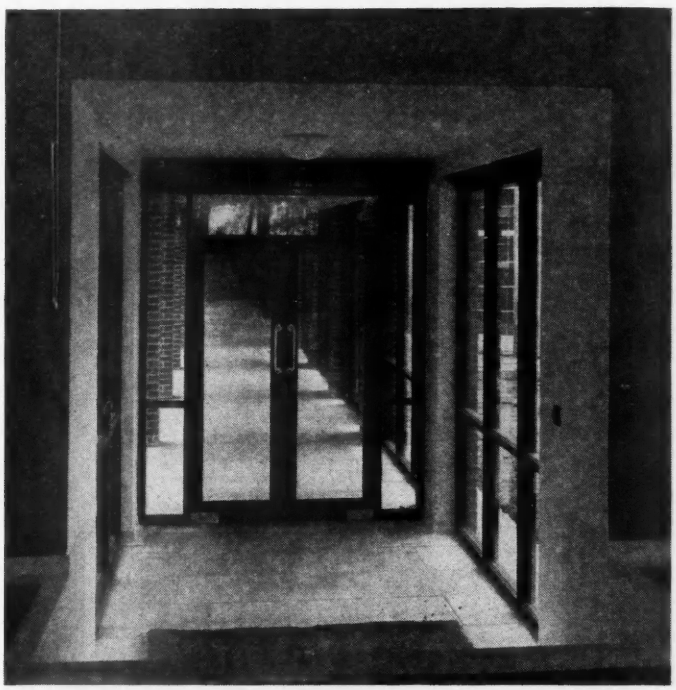
MALCOLM MITCHELL, A.R.I.B.A., ASSISTANT ARCHITECT IN CHARGE

THIS is the third stage of the additions to Withersdane Hall forming a new hall of residence for the girls of Wye Agricultural College.

In the first two stages about 70 study bedrooms for students were provided together with certain communal facilities, including students kitchens, laundry and ironing rooms, working clothes store, cycle store and several small common rooms.

The third stage includes a further 15 study bedrooms, domestic staff quarters, caretaker's flat and assembly hall in the new building, and a covered way between the second stage and the old building, which now forms a quadrangle. Alterations inside the old building have also been made to make the existing accommodation serviceable for present requirements.

The planning of the last stage was severely restricted due to the fact that a dining room and kitchens were originally intended on the ground floor of the third stage, but catering arrangements were altered to allow the provision of a small assembly hall as the College did not possess



View of covered way leading from second stage extension to old building

one. This is now used as a recreation room for the various social functions which are part of the College life, as well as for lectures of general interest.

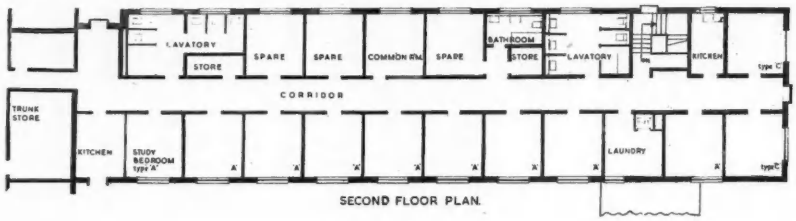
The construction of the building is precast concrete floors supported on concrete block cross walls (the floor over the assembly hall is supported on concrete columns and beams). This allows the external wall to be simply an enclosing skin, and the inner leaf of the 11 in. cavity wall is formed of foamed slag blocks for thermal insulation. The roof is of foamed slag blocks, screeded over and covered with copper sheet, supported by precast concrete purlins bearing on the concrete cross walls. Hardwood has been used for windows, doors and door frames in the assembly hall and covered way. The walls and ceilings generally have been plastered with ½ in. plaster.

Materials used in the assembly hall were as follows : Reflecting board over proscenium opening, sycamore veneered plywood; vertical hardwood strips on either side of proscenium opening, African mahogany; rear wall, acoustic tiles; ceiling, lime plaster wood float finish ; floor, oak strip; heating units, "copperad" convectors. Discs have been let into the walls at eye level so that pictures can be hung for travelling exhibitions. A hardwood rail has also been fixed at a height of 2 ft. 9 in. in order to avoid damage to the wall by chairs. A combination of wall and ceiling lighting has been used. The complete installation will give about 5 ft. candles at desk level so that the hall can be used for examinations. Further control below this level can be obtained.

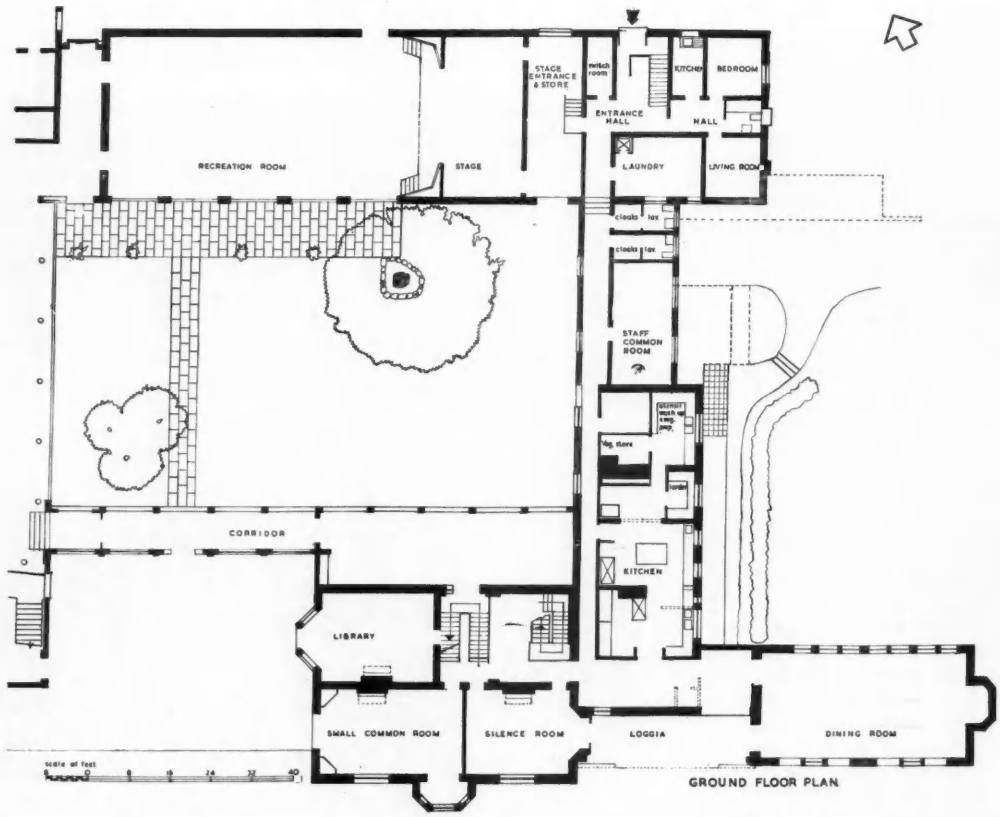
The following consultants were employed:—Mr. William Allen, of the Building Research Station, for the acoustics to the hall, Messrs. T. F. Burns and Partners, consultant structural engineers, and Messrs. E. C. Harris and Partners, chartered quantity surveyors.

The general contractors were G. E. Wallis and Sons, Ltd. Mr. John E. Sears was the clerk of works and Mr. George Smith, A.I.I.A., the general foreman.

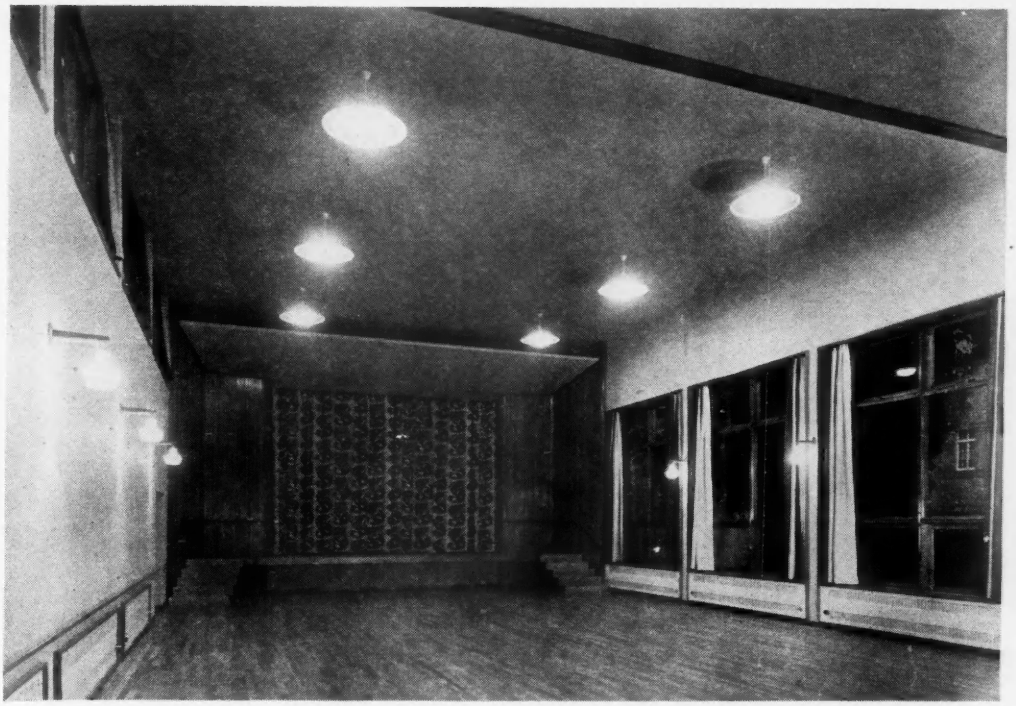
Sub-contractors were as follows : bricks, A. H. Herbert and Co., Ltd. ; artificial stone, Broadmead Products Co. ; tiles, Carters (Brockley), Ltd. ; woodblock flooring, Hollis Bros. ; patent flooring (Accotile), Armstrong Cork Co., Ltd.; cork floors, Reliant Tile and Flooring Co.; linoleum, Lenleys, Ltd. ; central heating, Benham and Sons, Ltd. ; electric wiring, G. E. Wallis and Sons (Elect.), Ltd. ; electric light fixtures, Merchant Adventurers, Ltd., Troughton and Young, Ltd. ; plumbing, Engineering Service Installations, Ltd. ; door and window furniture, N. F. Ramsay and Sons ; plaster, E. E. Cheeseman and Sons, Ltd. ; textiles, Gerald Holtom ; lifts (laundry), Hammond and Champness, Ltd. ; clocks, Gent and Co., Ltd.



SECOND FLOOR PLAN

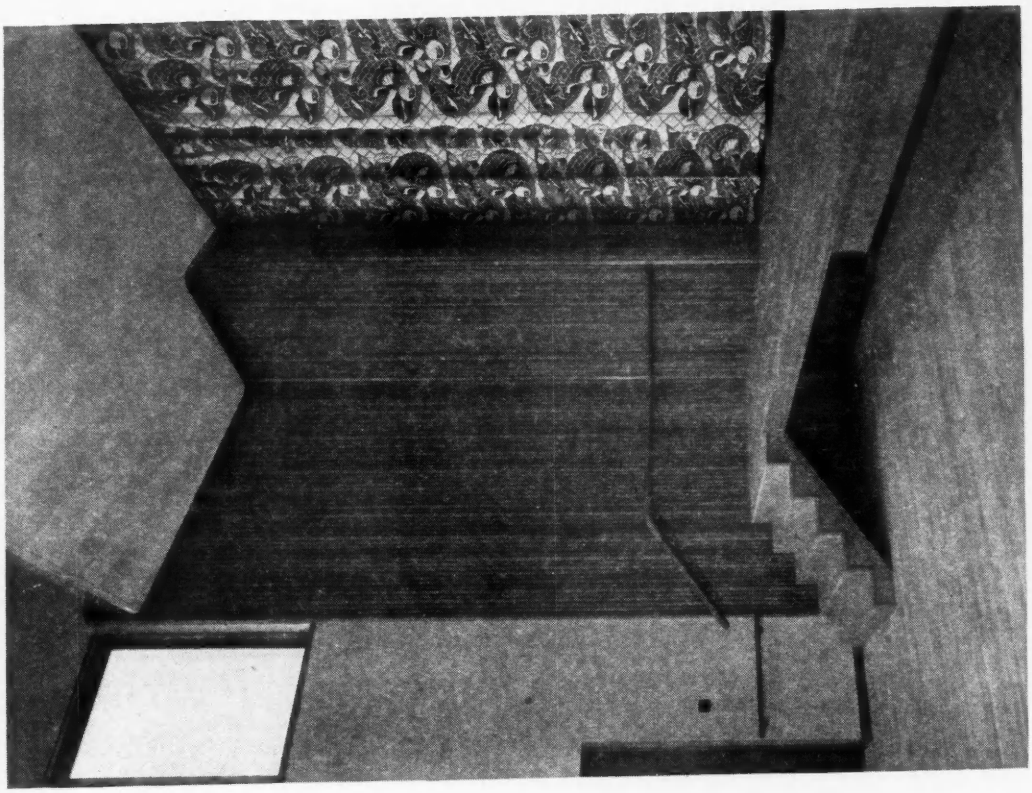


GROUND FLOOR PLAN

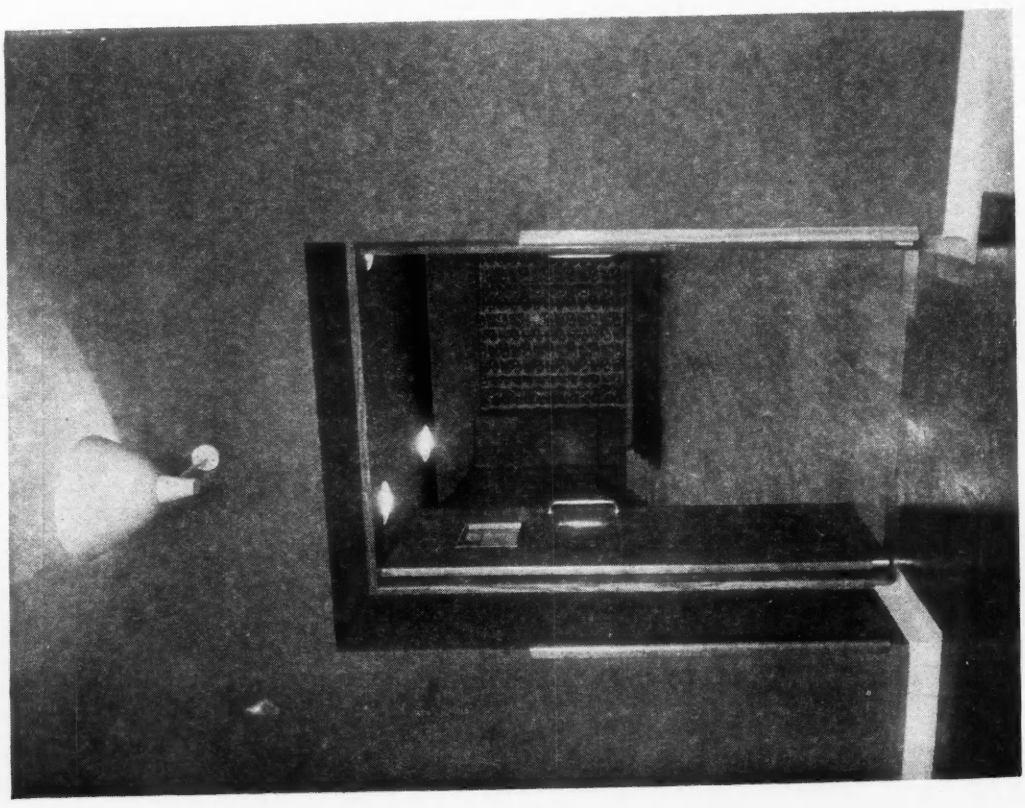


View along assembly hall to the stage

The assembly hall from the stage



Detail of the proscenium in assembly hall



View of assembly hall from the lobby

WITHERSDANE HALL, WYE COLLEGE, KENT

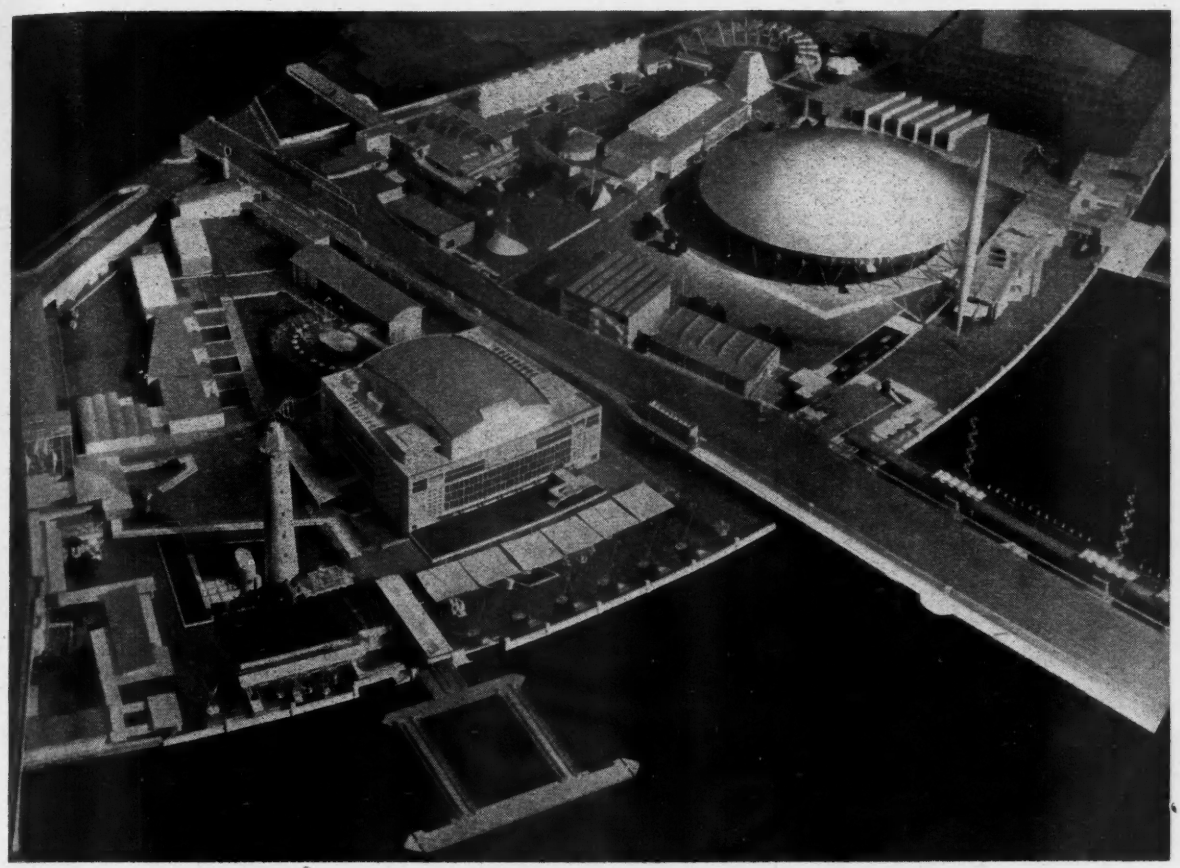


Fig. 1. The model of the South Bank Exhibition from the River Thames

MATERIALS in the SOUTH BANK EXHIBITION

4.—The Organisation of the Work

By JOHN RATCLIFF, A.R.I.B.A., A.M.T.P.I.

IN PREVIOUS ARTICLES (" The Builder," January 12, February 9 and March 9), Mr. Ratcliff has dealt with the use of materials in the construction of the South Bank Exhibition for the Festival of Britain. In the following article, Mr. Ratcliff (who is Deputy Co-ordinating Architect to Mr. Howard V. Lobb and Mr. Hugh Casson) outlines the complex organisation by which the work on the South Bank has been carried through.

IN 1850-51 over a period of six months, an exhibition building, designed by Joseph Paxton and costing about £170,000, was erected on a site of 20 acres in Hyde Park by a labour force which reached a peak of 2,260. That would represent a considerable achievement even to-day. How does this compare with the exhibition buildings and associated services, together with the exhibition displays now in course of erection on a 27-acre site in Lambeth?

Before describing the organisation of our present enterprise, it is necessary to give some idea of the varied tasks which form part of it. These tasks, as listed, have involved separate forms of organisation, and they are not, of course, of equal magnitude. Starting outside the exhibition site and working inwards, the first items are the works designed to improve traffic conditions in the immediate vicinity; these are the traffic roundabouts at the Westminster Bridge-road and Waterloo-road ends of York-road, together with the car parks on bombed sites, which are the responsibility of the London County Council (Chief Engineer, J. Rawlinson, and Valuer, C. H. Walker). There is also the bus station in York-road from which will operate the shuttle bus service to the Festival Pleasure Gardens at Battersea.

The second category concerns works which are, in the main, designed to facilitate entry into the exhibition. There is the escalator from the Waterloo underground station to surface level, which will form part of the permanent redevelopment of the site after the exhibition closes, and which is the responsibility of London Transport Executive. There is the high-level footbridge over York-road from Waterloo mainline station, undertaken by the Railway Executive (Chief Civil Engineer, Southern Region). There is the Bailey footbridge providing a direct entry from the northern embankment, erected by the Royal Engineers, the intermediate piers and the approaches at the north end being the concern of the L.C.C. (Chief Engineer). The Nelson and Rodney river-landing stages are also the responsibility of the L.C.C. in collaboration with the Port of London Authority. Allied works in this category are the extension to the Hungerford footbridge, which elevates a permanent public right of way above the exhibition, and the various maintenance and other works to the Hungerford railway viaduct, which were undertaken by the Railway Executive (Chief Civil Engineer, Southern Region).

Within the exhibition site itself, the negotiations with the existing tenants and the demolition of properties were handled by the L.C.C. (Valuer). The same Council is responsible for the two major works of the new River Wall and the Royal Festival Hall (Chief Engineer, J. Rawlinson, and Architect, R. H. Matthew, respectively). Allied to the latter are the heat pump installation—the alternative to the gas boilers in the Hall itself—which is sponsored by the Ministry of Fuel and Power, and the Concert Hall Booking Office in York-road (Festival Office).

We now come to the exhibition itself, and the first necessity was an up-to-date accurate survey of the site itself, which was carried out by the Ordnance Survey. The next step was the basic levelling of the site before building operations proper could start (Chief Engineer, L.C.C.). Then there is the maze of underground services; the Chief Engineer, L.C.C., together with the relevant Statutory Undertakings, is concerned with the sewers, surface water drains,

water, gas, and the ducts for the electric ring main, "low voltage" services, television and telephone, all of which are separate. The Festival Office is directly concerned with the water display services, including underground reservoir; the electric ring main in collaboration with the London Electricity Board; telephone, television and sound transmission services in collaboration with the G.P.O. and B.B.C.; external illumination services; and lastly, the so-called "low voltage" services, consisting of public address, crowd-counting, staff call signals, fire alarms, and television reception.

External to the buildings themselves are also the roads and pavings, some of which are being carried out under the Chief Engineer, L.C.C., and some directly by the Festival Office. Then there are the trees and landscape planting, undertaken by the Festival Office. The remainder of this long list consists of tasks which are the direct responsibility of the Festival Office: the building structures, and their related electric, gas, water, drainage and "low voltage" services (and here, in parenthesis, mention must be made of the contribution by the Royal Artillery and the R.E.M.E. in connection with the gun mounting at the top of the Shot Tower); the display construction; the exhibits (most of them in collaboration with the Council of Industrial Design); the "flat production" consisting of photomounts and captions; and lastly the "etceteras" which are necessary to complete an exhibition, such as seats, litter bins, symbols and signposting, mural paintings and sculpture, kiosks, drinking fountains, street decorations and guidebooks—until the mention of further items becomes tedious, all of them demanding a share of attention out of all proportion to their relative value to the major tasks.

It is necessary to inflict on the reader this long list because, in describing the organisation of the South Bank Exhibition within the compass of this article, full justice cannot be done to the part played by the various Authorities associated in it with the Festival of Britain Office. It is necessary, however, to take a brief glance at the main framework into which all these Authorities fit. The Minister of the Crown responsible for the whole of the Festival of Britain—of which the South Bank Exhibition is but one single, if important, part—was the Lord President of the Council and is now the Minister of Works. The Public Works (Festival of Britain) Act, 1949, confers the powers on the British Transport Commission (delegated to British Railways Executive, Southern Region and London Transport Executive) and on the London County Council to carry out some of the major engineering tasks enumerated above. These Authorities, as well as the Festival Office and the Royal Engineers, are represented on the South Bank Works Co-ordinating Committee, under the chairmanship of the Chief Engineer, L.C.C., which has watched progress of the tasks concerned and has unravelled some of the inevitable knots. In addition to the specific obligations placed on the L.C.C. by the Act, the Chief Engineer's Department has contributed, on the invitation of the Festival Office, the civil engineering advice and supervision of the basic levelling and the greater part of the underground services, roads and pavings within the site.

The Festival of Britain Office, which was set up in 1949 as a Government Department, consists, broadly speaking, of a series of advisory councils on the one hand, and the various departments, under the Director-General, Mr. Gerald Barry, on the other. (Table 1.) The main Festival Council is representative of a large number of interests and aspects of our national life, and is under the chairmanship of General Lord Ismay. The advisory council which interests us particularly here is the Council for Architecture, Town-Planning and Building Research, which was set up specially by the Lord President to advise on the part these subjects should play in the Festival as a whole. This council, under the chairmanship of Mr. Howard V. Lobb, advised upon the architectural design policy in the South Bank Exhibition in general, and with its support the design of the various buildings was entrusted to different architects of the younger school. What the Festival Office may have lost by this policy in ease of administration, the public will gain in variety of design, and the architectural profession in encouragement and patronage in these difficult times. The heads of the various departments form the Executive Committee, under the chairmanship of the Director-

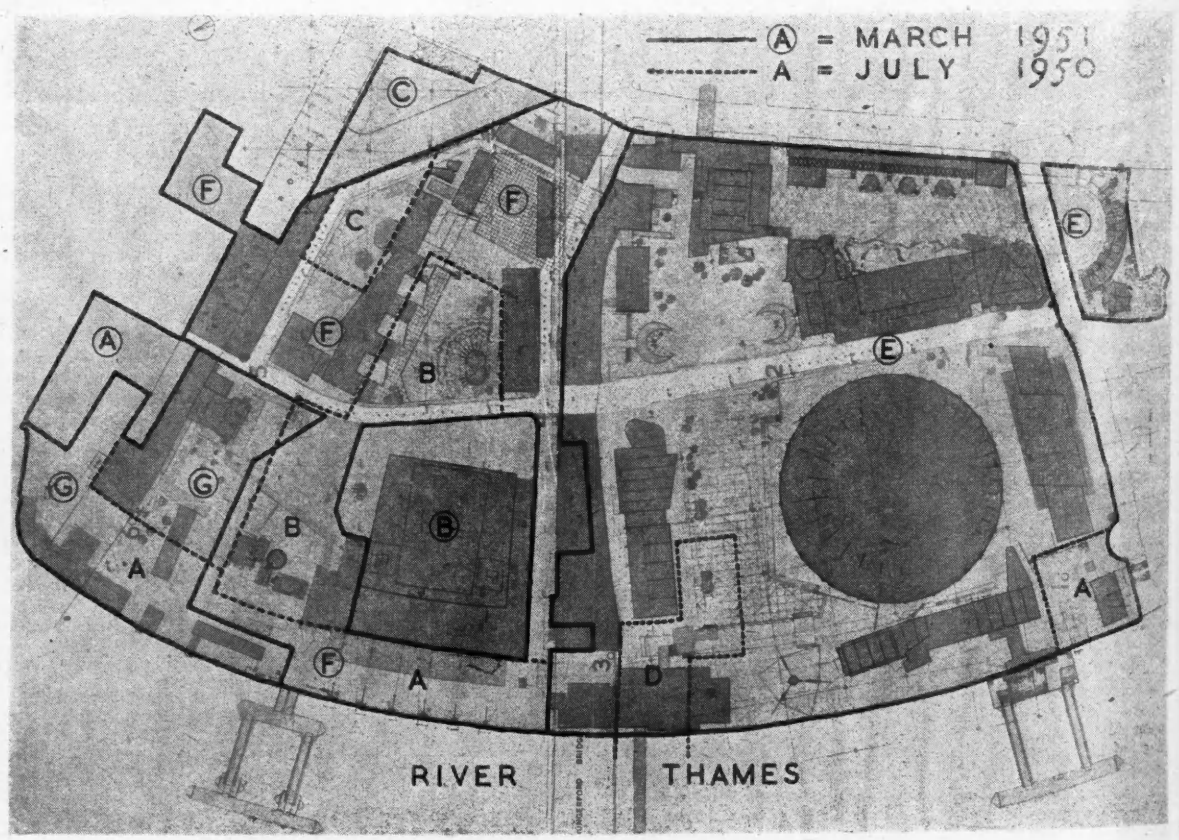


Fig. 2. Plan of the South Bank Exhibition. The areas occupied by the main contractors are as follows: A—River wall, Messrs. Richard Costain, Ltd.; B—Royal Festival Hall, Messrs. Holland & Hannen and Cubitts, Ltd.; C—York-road/Waterloo-road roundabout, Messrs. Fitzpatrick, Ltd.; D—Bailey footbridge, Royal Engineers; E—Exhibition buildings "Upstream," Messrs. Richard Costain, Ltd.; F—Exhibition buildings "Downstream," Messrs. Holland & Hannen and Cubitts, Ltd.; G—Exhibition buildings, Waterloo Bridge area, Messrs. Kirk and Kirk, Ltd.

Table 1.

FESTIVAL OF BRITAIN OFFICE

Advisory	Executive
FESTIVAL COUNCIL	DIRECTOR-GENERAL
Arts Council	CONTROLLER
Science Council	
Council for Architecture, Town-Planning and Building Research	Director, Exhibitions (Display, Management)
Council of Industrial Design	Director, Finance and Establishments (Finance, Contracts, Staff)
	Director, Science (Theme)
	Director, Architecture (Buildings)
	Director, Public Relations
	Arts Council Representative
	Council of Industrial Design Representative
	British Film Institute Representative
	Liaison Branch (Local Authorities)

General, which is responsible for all the Festival projects, of which, as mentioned earlier, the South Bank Exhibition is but one, if, perhaps, the largest.

The hierarchy dealing with the South Bank Exhibition is best explained briefly in terms of the various stages of execution, of which the first, apart from the story itself, is the design stage. (Table 2.) The Presentation Panel is responsible for all thematic and visual matters, and is advised on the latter by the Design Group, which deals with matters in detail, from buildings to litter bins, and displays to sculpture and mural paintings. The site is under the care of three co-ordinating architects (one "upstream" of Hungerford Bridge, one "downstream," and one for the Dome) and two co-ordinating designers, who are responsible for the activities of the section architects for buildings and section designers for display in their areas. In addition, there is a landscape consultant and two landscape architects. The section architects are advised on structural matters by the Consultant Engineers appointed by the Festival Office, and on matters affecting the safety of the public—for it will be remembered that the South Bank Exhibtion is not subject to the London Building Acts—by the Safety Precautions Officer of the Festival Office, and in matters of policy and cases of disagreement by the Safety Precautions Tribunal (consisting of the Controller, South Bank Construction—Mr. Howard V. Lobb, F.R.I.B.A., chairman—the Director-General, the Controller and the Director, Exhibitions). The section architects are also advised by a consultant on ventilation matters. A consultant has been specially appointed for the external illuminations; electrical consulting engineers have advised on other electrical matters, and the Ministry of Works have advised on the water displays.

The second stage (Table 3) can be called the construction of buildings, which, for the purpose of this present description, does not include the site work undertaken by the L.C.C., as described above. It will be noted that executive responsibility is entrusted to the Consulting Engineers, assisted by the Resident Engineer and his staff of Clerks of Works. There are three main building contractors, of whom more will be said presently.

The third stage, Display Construction (Table 4), which overlaps to some extent with stage two, is organised on different lines. Different display contractors, selected by competitive tender on a lump sum basis, are appointed to each pavilion, in order to spread the load, and are supervised direct by the Festival Office staff. Stage four, Exhibits, which again overlaps with stage three, and even stage two is a divided responsibility, the "industrial exhibits" being handled by the Council of Industrial Design, and the "non-industrial exhibits" by the Director, Exhibitions, and his staff. Brief mention must also be made of the management services, under the control of Director, Exhibitions, which include, apart from the preparations for the actual running of the exhibition, the responsibility for site security; the catering services concerned with the catering concessionaires who will operate the various restaurants; and the Technical Common Services section, which deals with problems of permits for materials as well as their scarcity.

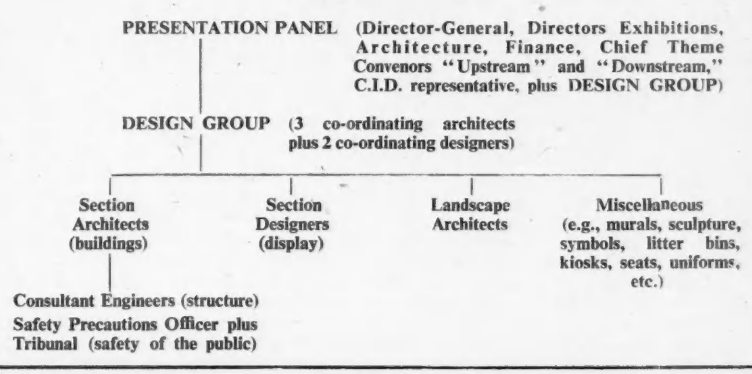
This duality of organisation between building and display construction, although useful in the design stage, did not prove entirely adequate in the executive stage, when problems of co-ordination on the site began to appear. The Controller, South Bank Construction, was therefore made directly responsible to the Director-General for integrating the separately conceived programmes for construction of buildings and display on the site, including handling of exhibits, site works and landscape, except where matters of design were concerned, which remained the responsibility of the co-ordinating architects and designers.

Having described briefly the scope of the work involved in connection with the exhibition and the organisation set up to deal with it, a short historical account of the work can now be given. The first task consisted of the selection of the South Bank site itself, which involved negotiations with Government Departments, Scotland Yard, the Railway and London Transport Executives, Port of London Authority, the London County Council, and others too numerous to detail. The second task was the writing of the theme of the exhibition, based on the terms of reference of the Festival of Britain — to show the British contributions to civilisation, past, present and future, in terms of the Arts, Architecture and Science — a formidable undertaking in itself, involving advisory panels of various kinds and investigations into the likely availability of exhibits to illustrate the theme. Parallel with this came the decisions on the basic layout of the site, coupled with the selection of the section architects and section display designers, the preparation of sketch designs and their approval, followed by working drawings and, in the case of buildings, structural engineering drawings. At the same time, estimates had to be made of the total electric load required, the number of main emergency exits and other imponderables, there being little precedent as a guide, and even if such data were available from other exhibitions it would hardly have been relevant in these circumstances.

After preparation of approximate estimates of the buildings by the Consulting Engineers, and consequent pruning and recasting of some of the designs, the next step was the selection of General Contractors for the buildings. Time did not allow for the preparation of bills of quantities, and these contracts were therefore let on a schedule of prices basis, sub-contracts for a great deal of the work being let on competitive tender. In practice the selection was limited by existing conditions on the site, for specific areas had already been allotted by the L.C.C. to Messrs. Richard Costain, Ltd., contractors for the River Wall, and Messrs. Holland & Hannen and Cubitts, Ltd., contractors for the Concert Hall, and the introduction of newcomers within such a confined building site would have proved impracticable. Accordingly, the area "upstream" of Hungerford Bridge was allotted to Costains, and the "downstream" area to Cubitts, the third smallest area in the vicinity of Waterloo Bridge being awarded to Messrs. Kirk and Kirk, Ltd., as a result of competitive tender. The civil engineering work of underground services, roads and pavings, as described above, which came under the supervision of the Chief Engineer L.C.C., was entrusted to the civil engineering departments of

Table 2.

STAGE 1.—DESIGN


PRESENTATION PANEL (Director-General, Directors Exhibitions, Architecture, Finance, Chief Theme Convenors "Upstream" and "Downstream," C.I.D. representative, plus DESIGN GROUP)
DESIGN GROUP (3 co-ordinating architects plus 2 co-ordinating designers)
Section Architects (buildings)
Section Designers (display)
Landscape Architects
Miscellaneous (e.g., murals, sculpture, symbols, litter bins, kiosks, seats, uniforms, etc.)
Consultant Engineers (structure)
Safety Precautions Officer plus Tribunal (safety of the public)

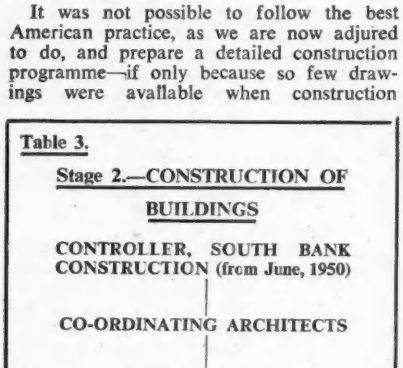
Costains and Cubitts in their respective areas. In spite of these relatively streamlined arrangements, the problems of space and the need for constant readjustment of contractors' boundaries were considerable.

The building site was handed over to the contractors in July, 1949—the same month as the 1851 Exhibition site—and the first task was the clearing away of an enormous pile of bomb damage rubble on the site of the Dome. Meanwhile, demolition of the remaining existing buildings was still proceeding, together with removal of the tenants, the last of whom was not due to go from the arches under Hungerford Bridge until May, 1951, although this was brought forward to January last by co-operation all round—a late enough date in any event!

It was not possible to follow the best American practice, as we are now adjured to do, and prepare a detailed construction programme—if only because so few drawings were available when construction started. Whilst there was a target date for completion of buildings in 16 months by the end of November, 1950, leaving six months for display construction and installation of exhibits, any programme for a project of this kind had necessarily to be flexible; for an exhibition is always planned against time, and is subject to many changes resulting from unpredictable circumstances. Some people, quoting output figures in terms of labour force and the rate of expenditure, wagged their heads pessimistically. But here again, there was no exact precedent, and the labour and rate of expenditure figures have obstinately refused in practice to work to rule! Delays there have undoubtedly been: late receipt of drawings from section architects; revisions of plan due to the development of the theme; non-availability of certain exhibits; the laudable but sometimes exasperating desire to improve; and the devastating budget reviews of July, 1949, December, 1949, and July, 1950; and lastly, the appalling weather of the last seven months, including the wettest February for 81 years, which has caused a loss of one-fifth of the working time and has delayed particularly the external pavings. For all that, by the end of last November, the Dome of Discovery had already been handed over a fortnight ahead of schedule, and by the end of the year 12 pavilions out of a total 19 were ready for display construction.

Table 3.

Stage 2.—CONSTRUCTION OF BUILDINGS



Although construction of buildings had to start precipitately, display construction had, at any rate in theory, more time for preparation, although, unlike buildings, display designs were dependent on a detailed script of the story. Whereas there were three main building contractors, there were 17 display contractors, selected by competitive tender on a lump sum basis. The areas allotted to these display contractors were necessarily confined to within the buildings they occupied, where they had to put their offices and stores, although they shared with the general contractors the canteens and latrines, and by special arrangement the general contractors provided all temporary lighting services. Such arrangements inevitably contravened the contractual doctrine that once a building site is handed over to a general contractor, it is his, come what may, until the job is complete. A careful procedure of handing over buildings to display contractors had to be worked out, wherein mutual responsibilities, including uncompleted items, were defined.

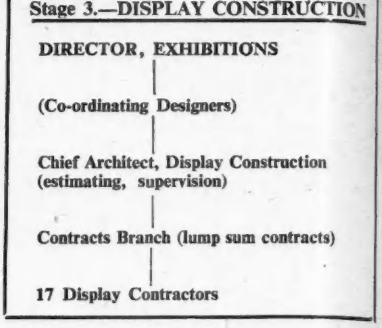
Space has always been a problem to contractors on this site, and Fig. 2 shows the areas occupied by the main building contractors in March, 1951, compared to July, 1950. In fact, the boundaries between these areas were constantly changing from the start, often as a result of diplomatic negotiation. Latterly, as buildings have been completed and handed over, and as the finished pavings have progressed, the available space has been woefully inadequate for the demands of stores and site offices, not only for the building and display contractors but a host of sub-contractors, as well as a large supervisory staff and the management branch, who must needs prepare for the opening day. In consequence, it has been necessary to acquire additional land adjacent to the northern boundary of the site, to which site offices and canteens could be removed in stages, as required by the programme of pavings.

As the work progressed other problems began to intrude. First, a system of temporary lighting had to be installed, externally as well as internally, to enable work to proceed after dark. Special precautions, such as steam boilers, had to be taken against the possibility, which fortunately never completely materialised, of severe and prolonged frost. Security arrangements had to be made, not only to prevent valuable materials and exhibits from disappearing, but also to prevent uninvited people from entering the site. Careful programmes were made for the reception of large and unwieldy exhibits, such as the locomotives, the machines in the Power and Production Pavilion, and many others too numerous to mention. A system of one-way traffic control was instituted, including the prohibition of private cars, to deal with traffic congestion. Arrangements were even made with the Meteorological Office to provide daily weather reports, including wind velocities and risk of lightning.

This necessarily brief account would not be complete without mention of the question of labour relations. Whereas the maximum labour force for the 1851 Exhibition was 2,260 four months after the start of the job, in this case the average number of building operatives and display construction men over the last six months has been about 1,650. The building industry has been put on its mettle to disprove some of the stories about output, and it has responded nobly in the face of trying conditions, particularly weather and time. There is no doubt that monetary incentives, in the shape of overtime and bonus payments, have helped in attracting a good type of man to the job. But there was more to it than just that, for here was a clear inspiring job, with target dates, instead of a seemingly vague and endless programme, such as housing. Furthermore, morale was kept high not only by talks about the job in the men's canteens and by special exhibitions, but also by visits of V.I.P.s, particularly their Majesties the King and Queen. One cannot help feeling that there is a lesson here that might well be applied to the vast building programmes that lie ahead of us.

Table 4.

Stage 3.—DISPLAY CONSTRUCTION



In spite of constant exchange of information between contractors' agents and men and works committees, and the seconding of Federation stewards and a special representative of the N.F.B.T.O. to the job, the going has not always been easy. For instance, on exhibition work of this kind, where experimental design has brought about many technical problems without precedent, questions involving demarcation between different trades were bound to arise, having national repercussions within the industry, and, in fact, nearly 50 separate disputes tribunals have been held to date. In addition, there have been negotiations between the Exhibition Contractors and the L.M.B.A.; questions of differential wage rate between building and exhibition display tradesmen, and questions of recruitment by display contractors and of overtime working in the face of redundancy of men required by the main building contractors. Considerable effects on progress have been brought about by the 11 strikes to date, of which the most serious has been the electricians' strike over rates of pay. For not only is there just the loss of time during each strike, but also the time lag in building up the labour force to its previous strength once work is resumed, due to men understandably not wishing to become involved and leaving the job.

And so looking back at 1850-51, with its expenditure of £170,000 in six months with a peak labour force of 2,260, one is still left with a sense of admiration at that achievement. But one is tempted to wonder whether, even in relative terms, there were quite so many complications as in this exhibition!

Following are the names of persons associated with the organisation of the South Bank Exhibition (excluding Authorities other than the Festival of Britain Office; also Section Architects and

Section Designers ; Contractors and Sub-contractors other than the main building contractors.)

PRESENTATION PANEL (see Table 2)

Director-General : GERALD BARRY.
Director, Exhibitions : CECIL COOKE.
Director, Architecture : HUGH CASSON.
Director, Finance : G. CAMPBELL.
C.I.D. Representative : A. HIPPESLEY COXE.
Chief Theme Convenor, "Upstream" : IAN COX.
Chief Theme Convenor, "Downstream" : MARK HARTLAND-THOMAS.
(plus Design Group).

DESIGN GROUP

Co-ordinating Architect, "Downstream": HUGH CASSON.
Co-ordinating Architect, "Upstream" : MISHA BLACK.
Co-ordinating Architect, The Dome : RALPH TUBBS.
Co-ordinating Designer, "Upstream" : JAMES HOLLAND.
Co-ordinating Designer, "Downstream": JAMES GARDNER.

CONSTRUCTION OF BUILDINGS (see Table 3)

Controller, South Bank Construction : HOWARD V. LOBB.
Co-ordinating Architects : (See DESIGN GROUP.)
Deputy to Mr. Lobb and Mr. Casson : JOHN RATCLIFF.
Deputy to Mr. Black : RICHARD MILES.
Staff Architects : L. H. GOODAY, H. B.LEATHER, C. W. NOBLE, J. SHELDON, J. YOUNG.

Safety Precautions Officer : D. MACKAY.
Landscape Consultant : FRANK CLARKE.
External Illuminations Consultant : L. C. KALFF.
Ventilation Consultant : HENRY GODDARD.

Consultant Engineers : FREEMAN, FOX AND PARTNERS in association with R. T. JAMES AND PARTNERS.
Resident Engineer : COLONEL L. S. ADLARD.
Consultant Electrical Engineers : MCLELLAN AND PARTNERS.
Supervising Electrical Engineer: H. G. BATSON.

General Contractors, "Upstream" : RICHARD COSTAIN, LTD.
General Contractors, "Downstream": HOLLAND & HANNEN AND CUBITTS, LTD. KIRK AND KIRK LTD.

DISPLAY CONSTRUCTION (see Table 4)

Director, Exhibitions : CECIL COOKE.
Chief Architect, Display Construction : W. J. FITT.
Deputy to Mr. Fitt : S. FERRADA.

CORRESPONDENCE

[Whilst we are glad to publish letters on professional and other matters of interest to our readers, it must be understood that we do not necessarily endorse the remarks of correspondents, who will oblige us if they will express their views as briefly as possible.]

Non-Traditional Housing

TO THE EDITOR OF *The Builder*

SIR,—While there is much of great interest in the report of the Scottish Housing Advisory Committee on "Design and Workmanship of Non-Traditional Houses" [summarised on page 530] there is also much that has been overlooked or ignored. Outstanding among the latter is the fact that, with one solitary exception, none of the so-called "non-traditional" houses is completely factory made. In fact, during the past two or three years many builders have reverted more and more to the use of bricks in the construction of this type of house.

Non-traditional houses have many merits in their own right—which were recognised by the Scottish Housing Advisory Committee—and they have also a number of points in their favour which should warrant a greater concentration on this type of house at the present time when both time and materials are short. The true non-traditional house, since it is completely factory made, can be in production all the year round and the flow of production only interrupted by the most violent weather conditions. Against this we must contrast the fact that with traditional brick houses and also those which are called non-traditional but actually are made largely of bricks, weather conditions invariably hold up production for about three months in every year. This means a loss of 25 years in a century, and with wars and their aftermaths holding up house building for another 25 years per century, the construction of houses is only possible by traditional methods 50 years in every hundred! And that is obviously not good enough.

Again, there is the fact that the amount of coal required to produce a given amount of concrete, etc., for the walls of a true non-traditional house is only about half that required to make the bricks to build an equivalent area of walling. With the nation's fuel resources as low as they are to-day, this is a point of vital importance.

The request made a short time ago by the Department of Health for Scotland that local authorities should build at least half of their year's allocation of houses by non-traditional methods was obviously made to take realistically the fullest possible advantage of the economies and speed which *true* non-traditional houses alone can offer. Otherwise the whole thing does not make sense.

ROBERT G. TARRAN.

Perth, Scotland.

"English Inn Signs"

TO THE EDITOR OF *The Builder*

SIR,—With reference to your review by G.J.H. of "English Inn Signs." In justice to Mr. M. Farrar Bell I would say that the reproduction in this book is from an old photograph of the "Spread Eagle" sign, Thame, that I painted myself and is *not* the present remarkable work by Mr. Farrar Bell.

From an old photograph also is the "Three Swans," Market Harborough, and not the present one that I painted two years ago. (In justice to myself may I add that my old friend, H. J. Birnstingl, was not quite justified in crediting himself with "the general conception and details" of my sign at Thame!).

JOHN FOTHERGILL.

"Three Swans," Market Harborough.

Operatives' Wage Increase and Cost of Building

TO THE EDITOR OF *The Builder*

SIR,—With reference to Sir Richard Copock's letter (April 6), I agree that Table A of the Girdwood Second Report gives 2,575 man hours. Unfortunately these are not the man hours required for our calculation. They exclude guaranteed time, travelling time and off-site labour. Also they relate to a house costing £1,321 in October, 1949, whereas we are supposed to be discussing a house costing £1,400 in January, 1951.

If Sir Richard would refer to pages 2 and 3 of the above Report he will find a figure of 3,250 man hours equivalent to 3,445 for a house costing £1,400. This latter figure has previously been quoted by me, and I still maintain that it is the correct one. It gives an increased labour cost of £43 1s. 3d.

Accepting Sir Richard's earlier statement that labour and material costs amount to 40 per cent. and 60 per cent. (presumably of the net building cost) and using my figure of £190 for on-costs, plant, overheads and profit, in the absence of any equivalent figure supplied by him, then his figure for the increased labour cost on a £1,400 house would be £43 11s. How then does he reconcile his latest figure of £31 based on the above Report equivalent to under £33 for a £1,400 house?

JOHN A. ROBERSON, A.R.I.C.S.

60, Greenways, Beckenham, Kent.

Dry Rot in Buildings

TO THE EDITOR OF *The Builder*

SIR,—My attention has been called to the article on dry rot published in your issue of January 26, and to recent correspondence on the subject.

All practical men will, I expect, feel great sympathy with Mr. C. W. Peach in the dizziness to which the tangle of growths has reduced him in his efforts to storm the subject of timber handling, even though it is so dreadfully obvious that he has wandered naked and unashamed into this domain of specialists, and that no closely woven and correct sheet of *Merulius Lachrymans* can cover his lack of sophistication. But I am afraid that there is no easy way, and if he wishes even to be seen in such classical orchards let alone to profit by their fruits, he must study very diligently not only reliable books but with keen eyes and a receptive mind must study his subject in the fields, woods and noisome places.

Have I somehow misread the Director of the British Wood Preserving Association or does one statement need qualification? Probably we are using the word "preservative" in different senses but creosote is so very commonly regarded and sold as a preservative that most members of the building professions will be misled by his statement that "all preservatives are poisonous to fungi"; field work shows that *Lentinus Lepideus,* unlike such revoltingly omnilignivorous gluttons as *Merulius Lachrymans,* seems to prefer its food well seasoned with coal tar distillates. I give my apologies for mentioning a point which will be obvious to him but which might confuse some of your readers and especially those human dyspeptics who have partaken of my more indigestible discourses.

BERTRAM C. G. SHORE, L.R.I.B.A.

London, W.1.

Russian Bricklaying Claim

TO THE EDITOR OF *The Builder*

SIR,—As Mr. G. E. Andrews's letter (*The Builder,* March 23) is the complete answer to the bricklaying stunt, I must apologise for adding my contribution, but as the record has passed out of the country I submit the following.

I remember having contact with a bricklayer employed at a colliery, who told me that, working on furnace work laying fire bricks, he had on one occasion laid 2,000 bricks in the hour. The method of laying was that the bricks were dipped in a bath of fireclay slurry and then placed in position, the labourer doing the grouting. This

work being of considerable substance it amounted to little better than stacking. As a point of interest, the fireclay slurry contained powdered glass which gave the furnace considerable strength and heat retention.

Now as 90 per cent. of work is carried out to-day on paper, a statistician might well say than two thousand bricks in one hour multiplied by eight gives sixteen thousand in a working day. Can this be called bricklaying ?

I have never had the pleasure of seeing Russian bricklayers in action, but I have worked in company with Russian carpenters, and their antics did not inspire one as record-making. I most heartily agree with Mr. Andrews, and would add that, excluding the too frequent "tea-up" section and the post-1938 builder who graduated on roofing felt and ceiling laths, the British builder is still the best, as indeed most things are British that matter.

W. A. ADAMSON.

Deal, Kent.

CODES OF PRACTICE

Draft for Comment on Sprinkler System

THE Council for Codes of Practice for Buildings has issued for comment Code 402.201, "Sprinkler Systems," prepared for the council by a committee convened by the Institution of Mechanical Engineers. The code deals with the general principles for the provision of automatic sprinkler installations in buildings. In addition to indicating the need to exchange certain information and to compile a time schedule for the installation of the system, the code lists the requirements for the various fittings and components, and refers to the British Standards where relevant.

The design section includes general information on the installation of the three types of systems—the wet-pipe, alternate wet-and-dry-pipe, and dry-pipe systems. There are recommendations regarding the number, position and operating temperatures of sprinkler heads, the operation of alarms, special precautions for systems liable to freezing, pressure gauges, valves and supply connections, piping, multiple-jet sprinklers and water supplies. There are also recommendations on systems suitable for dealing with oil fires.

Information is given on the actual work of installing the system, and on the regular tests necessary, including weekly and quarterly inspections.

The section of the code dealing with maintenance contains recommendations regarding the closing down and operation of the system after a fire, and the maintenance of valves, sprinkler heads, gauges, piping and fittings, hangers, alarms, tanks, and so on. There are notes on the number of spare sprinkler heads to be stocked, on avoiding the obstruction of heads, and on changes in temperature and fire risk.

The code is in draft form and is subject to amendment in the light of comments, which should be submitted by May 7 next. The draft carries the usual warning that, during the present abnormal conditions, it may not be possible to carry out all the recommendations.

Copies of the code may be obtained from the British Standards Institution, 24/28, Victoria-street, London, S.W.1, price 3s., post free, reference CP(B) 1003.

R.I.B.A.

Programme for British Architects' Conference

DETAILS of the arrangements in connection with the British Architects' Conference, which is to be held in Belfast from May 30 to June 2, at the invitation of the Royal Society of Ulster Architects (who are celebrating their golden jubilee) have been announced by the R.I.B.A.

All members and students of the R.I.B.A. and all members and students of the Architectural Association, the Association of Building Technicians and the Allied Societies are invited to attend the conference, and ladies are particularly invited to be present.

During the conference there will be an architectural exhibition within 100 yards of the city centre at the corner of Castle-street and Fountain-street. The exhibition, which will be open to the public, is sponsored by C.E.M.A. and completely designed and organised by the R.S.U.A. Free passes will be issued to conference members. The exhibition will be open from 11 a.m. to 9 p.m. The Northern Ireland Festival of Britain official exhibition will be opened on Friday, June 1. This is one of the high lights of the Festival programme, being the Ulster farm and factory exhibition at Castlereagh, Belfast. The indoor display covers 20,000 sq. ft. of factory space and the agricultural side will be the largest of its kind for the Festival in the U.K.

A number of tours and visits to places of interest have been arranged during the conference. Other events include, on the first day (Wednesday, May 30), an informal evening reception at which members will be the guests of the Royal Ulster Society of Architects. The Inaugural Meeting will be held on the Thursday morning at the Assembly Hall, Fisherwick-place, at which a reception and address of welcome to members will be given by the Lord Mayor of Belfast. Afterwards an address will be given by Mr. A. Graham Henderson, A.R.S.A., President, R.I.B.A., followed by a paper on "Architectural Education" by Mr. Martin S. Briggs, F.R.I.B.A., Honorary Secretary, R.I.B.A., and past chairman of the Board of Architectural Education.

In the afternoon of the same day there will be a garden party at Parliament Buildings, Stormont, when members will be the guests of the Prime Minister and Government of Northern Ireland. The conference dinner will take place on Thursday evening at the Grand Central Hotel, Royal-avenue, at which guests will be received by the President, R.I.B.A., and the President of the Royal Society of Ulster Architects.

On Friday morning, June 1, a paper will be read by Mr. Frederick R. Wylie, F.R.I.B.A., on "Industrial Buildings" at the Belfast Municipal Museum and Art Gallery. Half and full-day tours will also be available to members. For the Saturday morning visits have been arranged to Queen's University, the Municipal Museum and Art Gallery, and to the Castlereagh exhibitions.

The conference headquarters will be at the offices of the Royal Society of Ulster Architects, 7 College-square North, Belfast, telephone No. 22877. The conference programme, obtainable from the Secretary, R.I.B.A., 66 Portland-place, London, W.1, gives details of the tours and visits arranged (for which members must book by May 7), and also gives useful information on travelling facilities and hotel accommodation.

CHEAPER HOUSES AND LOWER RENTS

Local Authorities' Interest

REPORTS continue to reach the office of *The Builder* of the interest displayed by Housing Authorities in the subject of low-cost housing and the opportunity that some reduction of standards of accommodation and equipment offers to reduce capital cost and, consequently, rents and rates.

WREXHAM R.D.C. at its last meeting agreed to ask the Surveyor for a report on Messrs. Womersley and Hopkinson's winning design submitted in *The Builder* competition. In the earlier discussion Councillor J. H. Wootton-Davis said that these houses could be let at an economic rent, and he asked the Council to consider erecting this type of building. At the moment the houses being built were too large and too expensive.

A sub-committee whose job it will be to study plans for Council houses and make recommendations for reducing their cost has been appointed by DOVER RURAL COUNCIL. The appointment follows consideration of a report made by an official to the Exhibition of the competition designs in County Hall, London, in February.

YARMOUTH TOWN COUNCIL is experimenting with its own plans for a cheaper house, and has developed a design estimated to cost about £1,100. The Council's Engineer's Department is taking a close interest in a pair of houses being erected to the Competition winners' designs at IPSWICH by the local master builders' association. NORTHAMPTON COUNTY BOROUGH (to which authority Messrs. Womersley and Hopkinson are Borough Architect and Deputy Borough Architect respectively) has approved the erection of a block of four houses under its bye-laws, and it is expected that licences will shortly be granted.

Rising Building Costs

Because of steeply rising building costs STAFFORD COUNTY BOROUGH is to reduce the size of future municipal dwellings, erect them in terraces and eliminate some interior fittings. The Chairman of the Housing Committee (Ald. J. F. Amery) has stated that the cost of the average Corporation house had risen by approximately £200 to £1,500 during the last 12 months ; this was, of course, exclusive of the cost of land, sewers and roads. The last Budget, which increased the cost of petrol and made commercial vehicles liable to purchase tax, was, he said, responsible for £25 of this amount ; timber, which had risen by 50 per cent., had added another £60 ; while the recent wages increase accounted for between £30 and £40. All other ancillaries had gone up; copper had reached the point where it was almost out of the question to buy, and galvanised and cast-iron goods were other examples.

New houses, said Ald. Amery, would be smaller and would be erected in terraces ; they would include a number of two-bedroom dwellings for newly married couples and would be without such interior fittings as wardrobes and kitchen pieces.

OFFICIAL NOTIFICATION

Sulphuric Acid Prices

The Board of Trade order (quoted in *The Builder* of April 6) announcing that the maximum price of weak sulphuric acid (77 per cent. H_2SO_4) had been increased by 26s. 6d. per ton should have read 27s. 6d. per ton.

Fig. 1.—General view of some of the experimental houses

HEATING RESEARCH IN OCCUPIED HOUSES

Address by Dr. J. C. Weston, Ph.D., A.M.I.H.V.E., at the Institution of Heating and Ventilating Engineers

The following is a summary of the paper on "Heating Research in Occupied Houses" (based on work carried out by the Building Research Board of the Department of Scientific and Industrial Research), that was presented by Dr. J. C. Weston, Ph.D., A.M.I.H.V.E., at the Institution of Heating and Ventilating Engineers, in London, on March 14.

THE experimental houses used for heating research by the Building Research Station in Hertfordshire consist of four groups built at different times; amounting now to a total of 44 houses. The first group to be used were eight detached houses at Bucknalls-close, which were designed for a study of the economic aspects of thermal insulation, and consequently they have the same heating arrangements but differ in structural insulation. The research work in these houses, both during 1946-47, when they were unoccupied, and the first occupied winter, 1947-48, has already been published. The recording of fuel consumption and room temperatures continued until the summer of 1950, when the investigation was concluded.

The ten semi-detached pairs of houses at Abbots Langley were designed primarily for the study of heating systems and all are insulated to about the same extent, having *U* values around 0.20 B.T.U. per sq. ft. hr. deg. F. Work in the unoccupied houses was carried out during the winter of 1947-8 and since then the houses have been occupied. Some of the experimental houses are shown in Fig. 1.

Heating methods particularly suitable for "open-plan" houses have been studied in a terrace of four houses, heated by forced warm air supplied by a solid-fuel furnace burning bituminous coal. These houses, on the same site at Abbots Langley, are now occupied by tenants.

Finally, four houses of each of three types of non-traditional building (Airey and Wimpey houses and the Hawkesley aluminium bungalow) have recently been completed. This group was chosen to provide data on the effect of thermal capacity on the heat requirements of houses rather than because of their intrinsic interest as forms of non-traditional construction. Table I summarises the essential heating data concerning the houses.

In the planning and unoccupied periods of these experiments the distinction between the various groups of houses is clear. In the occupied period, however, the effects of the occupants' behaviour in respect of house temperatures, expenditure on fuel, window-opening, etc., tend to reduce the importance of such distinctions. While, therefore, this report is mainly concerned with results relating to the 20 houses (houses 9 to 36) during the period 1948 to 1950, data obtained at Bucknalls-close is quoted where it serves to illustrate specific points.

In occupied houses the "thermal habits" of the occupants plays a most important part in the results, and information must finally be obtained in such a form that is, so far as possible, independent of these habits or representative of average behaviour. With only one house having a particular heating system and one family in each house, no estimate of the variation between different families with the same heating system is possible. Ideally, several houses with similar heating systems are required, but these were not available in this instance.

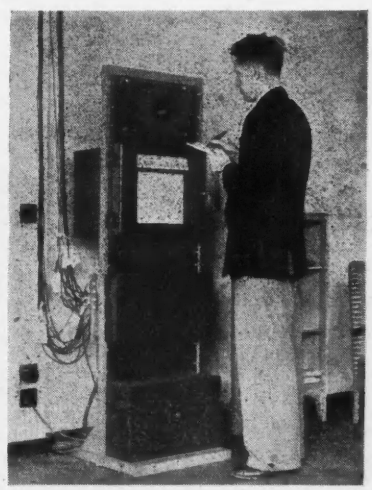


Fig. 2.—The "Multelec" integrated temperature recorder

However, an alternative approach, which has come to be known as "tenant rotation," was adopted and promises a measure of success. The tenants are moved from house to house at intervals of about one year. This scheme has been applied to the 20 houses and the terrace of open-plan houses, and so far two rotations have been made. A third and final move is to be carried out during the summer of 1951, so that by 1952 each house will have been lived in by four different families and data from the unoccupied period will also be available. While this technique provides no information on variations between houses having nominally the same heating system, it will give data on the variation between different tenants with the same house and heating system. The moves have been planned so that each house has, at different times, as wide a range of "thermal load" as possible; that is to say, as much variation in mean temperature difference, ventilation rate, hot-water usage, and so on, as is available within the habits of the different families. In this way those factors which may be expected to be independent of thermal habits can be studied over a wide range of other variables so that their constancy within a given range can be established, or the extent of their variation determined in terms of some other observable factor.

Measurements

During the occupied period, the air temperatures of all rooms of all the houses are recorded continuously by 12-point Multelec recorders and electric resistance thermometers; the measuring position in each room being at a height of 5 ft. above the floor and at a position chosen to be representative of the temperature of the whole room. The outside climate—temperature, wind speed and sunshine—is also recorded. (Fig. 2.)

With several hundred temperature measuring points to be provided the number of recorders required is prohibitive, but by means of a "multiplying circuit" of P.O.-type relays it has been possible to increase the number of points measured by each recorder. Now all recorders in use are provided with a "four times" multiplier so that they can each deal with 48 resistance thermometers. At the same time the averaging of readings to obtain weekly mean temperatures was a major burden, now lightened by means of an "integrator" which automatically converts the readings as they are obtained, into electrical impulses which are counted by P.O.-type counters. Obtaining weekly mean temperatures is thus reduced to the weekly reading of counters.

The weekly consumption of gas, electricity and solid fuel is obtained by housing managers, who have general responsibility for the houses and for obtaining the reactions of the tenants at intervals. The tenants pay for their fuel weekly at rates which are typical of those current in the London region. In the early stages of full-scale house-heating trials at Bucknalls-close, the tenants received a subsidy on their fuel bills, but this was later removed. As will be seen, this provided a most convincing demonstration of the interaction of occupants' behaviour and the cost of fuel, but at the

TABLE I.—ESSENTIAL HEATING DATA OF EXPERIMENTAL HOUSES

House	*Location*	*Plan Type*	*Heating*	*Notes*
1	Bucknalls-close	Detached	Radiators fed by magazine boiler.	
2	,,	,,	Ceiling panel heating fed by magazine boiler.	
3	,,	,,	,,	
4	,,	,,	,,	
5	,,	,,	,,	
6	,,	,,	,,	
7	,,	,,	,,	
8	,,	,,	Radiators fed by magazine boiler.	
9	Abbots Langley	Semi-detached, through living-room plan.	Continuous burning open fire, convection to bedrooms, domestic boiler, gas cooker.	Replaced by continuous burning open fire with back boiler, gas cooker, Summer, 1949.
10	,,	,,	Continuous burning open fire, convection to bedrooms, gas storage water heater, gas cooker.	Storage heater replaced by divided storage heater, Autumn, 1949.
11	,,	,,	Gas space heating, solid-fuel domestic boiler, gas cooker.	Gas sink heater and bath heater added Spring, 1949.
12	,,	,,	Electric space heating, solid-fuel domestic boiler, electric cooker.	Electric sink heater added Spring, 1949.
13	,,	,,	Central heating from magazine boiler, electric cooker.	Boiler replaced by automatic coke-burning boiler, Summer, 1950.
14	,,	,,	,,	
15	,,	,,	Partial central heating with electric topping-up, electric cooker.	Thermostatic electric immersion heater added Spring, 1949.
16	,,	,,	Central heating from magazine boiler, electric cooker.	,,
17	,,	,,	Inset openable stove with convection to bedrooms, electric storage water heater, electric cooker.	
18	,,	,,	Inset openable stove with convection to bedrooms, free-standing solid-fuel cooker.	Replaced by improved open fire with back boiler, radiators in dining space and kitchen, gas cooker, Autumn, 1949.
19	,,	,,	Warm air panels fed from radiator in duct, electric cooker.	Replaced by warm air cabinet heater, Autumn, 1949.
20	,,	,,	Improved open fire, free-standing solid-fuel cooker.	
21	,,	,,	Continuous burning open fire with back boiler, gas multipoint water heater, gas cooker.	
22	,,	,,	Free standing stove with back boiler, gas cooker.	Thermostatic electric immersion heater added Spring, 1949.
31	,,	Semi-detached, kitchen-living-room and parlour plan.	Back-to-back cooker.	Appliance replaced by newer model, Summer, 1949; gas sink heater added Spring, 1949.
32	,,	,,	Prefabricated heat service unit, gas cooker.	
33	,,	Semi-detached, through living-room plan.	Open fire with domestic boiler, gas cooker.	
34	,,	,,	Open fire with back boiler, gas cooker.	Gas circulator and sink heater added Spring, 1949.
35	,,	Semi-detached, kitchen-living-room and parlour plan.	Oven-over-fire combination grate, open fire in parlour.	
36	,,	,,	Side-oven combination grate, open fire in parlour.	
37	,,	Terrace, open plan.	Forced warm air heating from solid-fuel furnace, gas circulator, gas cooker.	
38	,,	,,	Forced warm air heating from solid-fuel furnace, gas circulator, electric cooker.	
39	,,	,,	Forced warm air heating from solid-fuel furnace, gas circulator, gas cooker.	
40	,,	,,	Forced warm air heating from solid-fuel furnace, gas circulator, electric cooker.	
41	,,	Semi-detached, Wimpey house.	Continuous burning open fire with back boiler, two radiators downstairs, gas cooker, gas multipoint water heater.	
42	,,	,,	,,	
43	,,	,,	,,	
44	,,	,,	,,	
45	,,	Detached, aluminium bungalow.	Continuous burning open fire with warm air to bedrooms, electric cooker, immersion heater.	
46	,,	,,	,,	
47	,,	,,	,,	
48	,,	,,	,,	
49	,,	Semi-detached, Airey house.	Continuous burning open fire with back boiler, two radiators downstairs, electric cooker, immersion heater.	
50	,,	,,	,,	
51	,,	,,	,,	
52	,,	,,	,,	

same time it shows that for valid results in this type of experiment it is essential that the economics must be "normal."

The room temperatures and fuel-consumption data form the basic information, but for subsequent analysis a knowledge of ventilation rates is required. This was obtained partly from investigations when the houses were unoccupied, and partly by measurements during the occupied period. To supplement these measurements, observations of the window-opening habits of the individual households are made regularly throughout the winter. All this data together enables the ventilation heat-loss to be deduced.

Weekly records of the heat contained in hot water used for baths, at the sink and wash-basin, have also been kept.

Seasonal Temperatures

The seasonal mean temperatures, room by room, for the 20 houses for the 33 weeks October 1 to May 19 are given in Table II, together with the mean house temperatures. The mean house temperature is the arithmetic mean of all the rooms, with the living-room included twice to allow for its greater size and/or ventilation rate.

Confining attention for the moment to the "house mean" temperatures it will be seen that there is a wide range (53.9 deg. F. to 61.3 deg. F. in 1948-9 and 53.5 deg. F. to 63.5 deg. F. in 1949-50), and also that there are large differences between the same house in the two years, due to the different requirements of individual households. The overall picture has, however, changed little between the two years, the "site mean" being 57.8 deg. F. and 58.3 deg. F. with corresponding temperature differences between inside and outside of 13.3 deg. F. and 12.9 deg. F. An investigation of the temperature in over 200 local authority houses during the winter of 1949-50 showed that, in houses insulated to the same degree as the experimental houses, the mean house temperature difference was 12.9 deg. F. It seems reasonable to conclude that the temperatures of the houses at Abbots Langley are not unrepresentative of the majority of such houses.

The mean house temperature is not, of course, by any means constant from week to week, but decreases with decreasing outside temperature. There are a number of reasons for this. Since the heating of houses in this country is usually intermittent, the temperature in the "unheated" period will de-

TABLE II.—MEAN TEMPERATURES, ABBOTS LANGLEY

Period—October 1st to Mid-May

Winter, 1948-9. *House No.*	9	10	11	12	13	14	15	16	17	18	19	20	21	22	31	32	33	34	35	36
Living-Room (1)	60.7	59.1	60.1	59.8	61.6	61.1	59.5	59.8	60.2	57.0		60.0	55.7	62.4	61.2	58.6	58.1	57.7	53.8	53.8
Dining Space (2)	62.0	57.7	61.4	67.4	67.5	63.9	64.2	64.6	58.7	64.2		64.0	56.0	60.9	60.3	57.1	62.1	56.4	64.7	60.6
Kitchen (3) ...	63.6	58.3	63.6	68.9	69.3	64.3	65.8	64.3	59.0	67.0		66.9	58.2	63.1	57.0	55.1	63.8	58.6	58.7	56.8
Hall	57.0	53.6	54.7	54.4	57.4	56.1	59.4	56.9	56.2	57.8	EMPTY	55.0	54.1	59.1	53.0	56.2	53.5	53.9	48.5	47.7
Landing ...	57.7	56.3	56.5	52.6	58.9	58.9	59.4	58.7	58.8	60.0		56.6	56.8	61.1	55.8	56.2	56.9	58.0	50.5	49.6
Bedroom 1 ...	58.8	55.4	55.6	52.8	56.8	58.6	56.9	58.4	61.8	56.9		54.8	53.3	57.0	59.5	56.8	57.0	53.3	55.5	55.2
Bedroom 2 ...	59.1	53.7	56.6	53.9	58.0	58.2	55.0	58.8	62.8	58.0		55.2	53.9	57.6	58.7	55.6	56.6	54.4	53.7	53.4
Bedroom 3 ...	57.7	53.5	55.5	54.2	58.4	60.4	54.9	59.0	58.7	57.3		54.1	49.2	54.3	53.2	51.3	56.1	50.4	51.9	51.3
Bathroom ...	59.7	54.7	55.9	54.4	62.9	62.0	61.1	61.0	58.8	60.9		54.7	53.6	58.6	53.2	56.2	58.6	56.0	48.6	49.6
House Mean (4)	59.8	55.9	58.0	57.9	61.3	60.5	59.5	60.1	59.6	59.5		58.1	54.8	59.7	57.2	56.0	58.0	55.6	55.1	53.9

Outside Temperature— 44.5 deg. F. Windspeed—8.2 m.p.h.

Winter, 1949-50. *House No.*	9	10	11	12	13	14	15	16	17	18	19	20	21	22	31	32	33	34	35	36
Living-Room (1)	61.7	59.0	60.1	59.6	61.7	64.8	64.1	64.8	62.1		66.0	59.6	57.3	60.0	65.6	55.7	58.3	57.7	53.7	52.6
Dining Space (2)	58.0	59.8	60.5	63.3	63.9	65.8	69.8	69.8	58.4		65.1	64.8	56.1	58.0	65.3	56.5	62.0	54.3	59.0	60.7
Kitchen (3) ...	60.0	59.2	63.2	63.9	66.1	66.7	76.6	68.4	58.0		66.3	67.4	58.4	57.9	58.8	55.6	63.9	56.5	55.7	58.2
Hall	54.3	52.5	56.2	55.8	61.6	59.6	58.0	64.2	52.6		58.2	56.3	54.3	53.9	53.5	55.2	53.0	53.5	48.7	48.6
Landing ...	55.4	54.9	58.9	56.6	64.6	61.3	58.6	62.7	59.1	EMPTY	59.8	56.9	57.1	56.8	56.2	55.4	54.0	56.0	50.3	49.4
Bedroom 1 ...	56.4	54.2	57.3	56.2	61.7	62.7	58.1	59.3	58.9		57.6	56.3	53.4	53.9	57.9	54.1	52.5	53.5	54.7	54.9
Bedroom 2 ...	55.6	53.4	60.1	56.6	64.1	62.4	58.5	59.1	59.6		56.8	55.9	54.2	54.5	58.5	54.8	52.3	52.0	53.2	53.0
Bedroom 3 ...	53.3	53.0	56.1	54.2	62.3	61.0	58.7	59.0	58.1		54.6	55.4	51.6	50.8	53.7	50.6	50.7	50.8	52.0	50.7
Bathroom ...	57.7	54.1	56.8	57.2	63.1	61.4	58.0	62.7	54.9		58.7	54.6	54.5	54.6	53.7	55.4	54.2	54.8	48.7	49.8
House Mean (4)	57.4	55.9	59.0	58.3	63.1	63.0	61.9	63.5	58.4		60.9	58.7	55.4	56.1	58.9	54.9	55.7	54.6	53.5	53.9

Outside Temperature—45.4 deg. F. Windspeed—8.5 m.p.h.

NOTES.—(1) Parlour in 31, 32, 35 and 36. (2) Kitchen-living-room in 31, 32, 35 and 36. (3) Scullery in 31, 32, 35 and 36. (4) Mean of all rooms, living-room included twice except in 31 and 32, where parlours are included twice, and 35 and 36 where kitchen-living-room is included twice.

crease with outside temperature. Also the appliances installed have only a limited output and at a certain level of outside temperature the appliance will be unable to provide the required output; any further fall in outside temperature will cause a corresponding drop inside. Finally, and possibly the most important cause, is that the tenants may be unable or unwilling to increase their expenditure to the extent required to maintain constant temperature inside in the face of a falling outside temperature. It was found that the weekly mean inside temperature falls about 0.5 deg F. for each degree drop of outside temperature.

Cost of Fuel

The importance of thermal habits and the ability and/or willingness of the tenant to pay for fuel is brought out strikingly by results obtained in the houses at Bucknallsclose. In 1946-7 the tenants received a subsidy amounting to about two-thirds of their fuel bills. In 1947-8 the subsidy was reduced to one-third and in 1948-9 it was removed altogether. In 1949-50 a 25 per cent. subsidy was given on solid fuel only. The weekly mean temperatures of the eight houses year by year are shown in the upper part of Fig. 3 (the individual points have been omitted for the sake of clarity). The consistent fall of temperature within the houses as the subsidy was removed and the subsequent rise with the slight subsidy in the last year is noticeable. It should perhaps be emphasised that although the occupants accepted lower temperatures as the price of fuel was increased there was also a substantial increase in expenditure. In 1948-9 the expenditure was, in fact, about twice that in 1946-7, while the fuel prices had increased about threefold. The result is shown even more convincingly in the lower part of Fig. 3, where the seasonal mean-temperature difference between inside and outside is plotted against the mean cost per week per degree temperature difference between inside and outside.

It has been made clear that the temperatures in a house are a function not only of heating arrangements, but also of tenants' circumstances. At present, therefore, differences between corresponding rooms in different houses in Table II should not be too closely examined, but there are general features about which conclusions may validly be drawn. Observations indicate that in the living-room in houses of traditional construction the seasonal mean living-room temperature is likely to be 60 deg. F. The bedroom temperatures show a wide range, but nowhere are they unduly low, even in the "unheated" bedrooms. When the outside temperature is 32 deg. F. the bedroom temperatures will be 8 to 10 degrees lower than the seasonal mean, but even allowing for this it is clear that excessively cold bedrooms are unusual and limited to the small bedroom (bedroom 3) in one or two houses. This confirms the view suggested by earlier papers, that in houses insulated to a reasonable extent ($U = 0.20$ to 0.25) there is little necessity for the background heating of bedrooms and the use of convected warm air or radiator heating of bedrooms appears to be mainly applicable to less well insulated houses.

Of the A plan houses, numbers 10, 17, 21 and 34 have "unheated" kitchens; that is, they have no appliance other than the cooker and a well-insulated gas (10) or electric (17) storage water heater or a gas multipoint water heater (21). The average temperatures of these kitchens in 1948-9 lies between 58.2 deg. and 59 deg. F. as compared with a mean value for the other 11 A plan houses of 65.5 deg. F. A similar difference is noticeable in the following year, and these kitchens have in all cases been adversely commented on by the occupants. The provision of heat in the kitchen is evidently of greater importance than in the bedrooms, which were generally considered satisfactory.

Living-room Temperatures

For many purposes the variation of temperatures of individual rooms is of interest. It has already been shown that the temperature of the whole house will, on the average, fall about 0.5 deg. F. for each 1 deg. F. fall of outside temperature, but it would not be expected that the fall would be so marked in the living-room, and during the evening especially (at, say, 9 p.m.) the living-room temperature would be expected to be more or less constant at 65 deg. F. if the usual "comfortable" temperature is assumed. Figures show that the weekly mean living-room temperature averaged over the site falls about 0.4 deg. F. for 1 deg. F. fall of outside temperature. Observation of the distribution of living-room temperatures at 9 p.m. for three different outside temperatures, "mild," "average" and "cold," over a period of two weeks, give average temperature at 9 p.m. in the three cases as 51.1 deg. F., 45.4 deg. F. and 33.4 deg. F. It is clear that in average or mild weather the commonest observation is in the range 67 deg. F. to 69 deg. F., and there are a substantial number of readings over 70 deg. F. Many of these higher values occur in the centrally heated houses, and this suggests that the higher temperatures current in North America may be associated more with convective heating than with basic differences in comfortable temperatures between Britain and America. It is noticeable that in cold weather the range of the readings increases; not only does the "peak" move to a much lower value, but there remain a substantial number of very high values. These are mainly due to house 19, where the warm-air heating gave high vertical temperature gradients so that although the temperature at the thermometer point 5 ft. above the floor might be 80 deg. F., that at 2 ft. 6 in. might be no more than 60 deg. F. or 65 deg. F. The very low values, say less than 51 deg. F., probably only arise when the occupants are out or using some other room, such as the kitchen, as their sitting-room. General indications are that the comfortable air temperature for sitting during the evening is well over 65 deg. F. and probably nearer to 70 deg. F.

Thermal Input

From what has been said it will be clear that the amount of heat used annually will depend partly on the heating installation in the house and partly on the occupants' requirements. Detailed comparison is therefore inappropriate, but the general level of consumption is of interest. Where a group of houses can be considered, as, for example, in comparing the fuel consumption for cooking by gas or electricity, valid conclusions can be drawn.

Table III gives the house-by-house fuel consumption for space and water heating and cooking for the two years from May 1, 1948, to 1949, and from May 1, 1949, to 1950. The data for each year are divided under the headings of "winter" and "summer." The "winter" period covers the 33 weeks from about October 1 to May 19, and the summer the remainder. Most of the fuel consumption for space heating occurs during the winter, and though occasionally fires may be used for this pur-

pose during the rest of the year this arbitrary division is convenient in analysis.

The yearly consumptions cover a very wide range, but half of the observations are less than 1,050 therms. The summer consumption shows certain interesting features, and there is little doubt that the provision of auxiliary gas or electric water heaters for summer use substantially reduces the thermal input during this period.

From a national viewpoint, the thermal input is of less importance than its coal equivalent, which is the amount of raw coal required to provide the gas or electricity used plus the coal burned directly in the house. To obtain this figure, the gas and electrical consumption (and coke consumption) must be multiplied by their appropriate production efficiencies, i.e., the efficiency with which, say, electricity can be obtained from coal and distributed to consumers. The latest British Eleetricity Authority figures give 21.15 per cent. for the average power-station thermal efficiency, and from this must be deducted an allowance for distribution losses. All things considered, a production efficiency of 20 per cent. appears reasonable for the present. For gas the corresponding figure at present is probably around 75 per cent. (the convention being adopted that both gas and coke are produced with the same efficiency). The coal equivalent consumptions for summer, winter and the whole year are also given in Table III. The values in terms of raw coal indicated are based on the rough approximation that one ton of coal is equivalent to 300 therms. Of the 35 observations, 10 lie below four tons and four are around three tons. From an analysis of the heat requirements of houses around 1,000 sq. ft. it was concluded that even in a well-insulated house three to three and a half tons of raw coal will provide only a minimum service, but three and a half to four tons are adequate to give average conditions. The result just quoted may be taken as a direct experimental confirmation of these con-

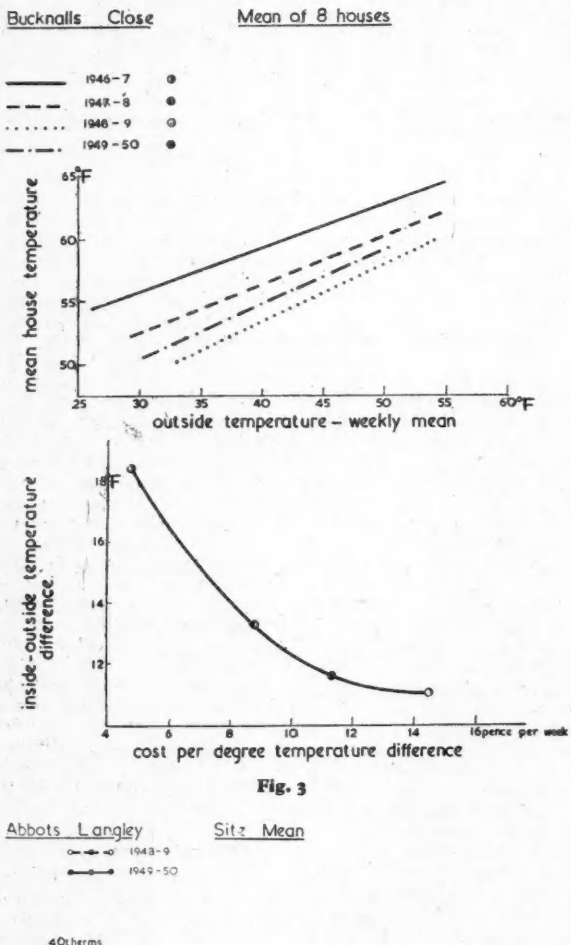


Fig. 3

Fig. 4

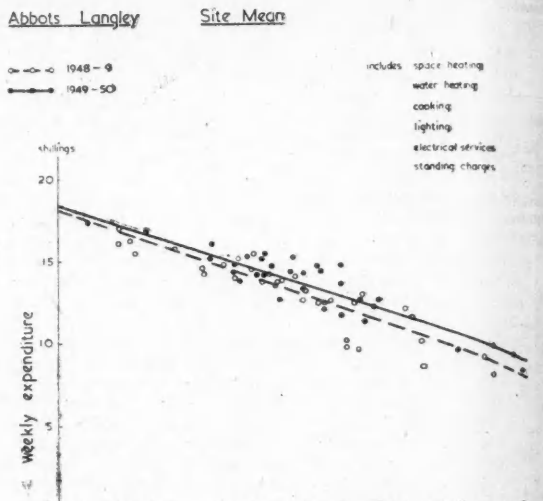


Fig. 5

Fig. 6

TABLE III.—THERMAL INPUT.—Abbots Langley, 1948 to 1950

House	Summer 1948 Therms SF	Gas	Elec.	Total input therms	Coal equivalent therms	Winter 1948-49 Therms SF	Gas	Elec.	Total input therms	Coal equivalent therms	Summer 1949 Therms SF	Gas	Elec.	Total input therms	Coal equivalent therms	Winter 1949-50 Therms SF	Gas	Elec.	Total input therms	Coal equivalent therms	Annual thermal input 1948-9	1949-50	Annual coal equivalent thermal input 1948-9	1940-50
9	426	55	9	490	544	1146	139	41	1326	1536	EMPTY					837	74	20	931	1313	1816	—	2080	—
10	58	67	3	128	163	505	199	12	716	830	18	57	5	80	119	415	127	33	575	739	844	655	993	858
11	185	37	3	225	249	424	354	17	795	981	78	34	4	116	158	374	283	29	686	1021	1030	802	1220	1179
12	225	1	22	249	336	484	2	104	590	1007	134	—	28	162	290	451	—	156	608	1381	839	770	1343	1671
13	277	4	21	302	387	845	7	38	890	1041	345	2	34	381	518	980	7	52	1039	1249	1192	1420	1428	1767
14	295	—	25	320	420	824	—	53	877	1089	216	—	21	237	321	863	—	47	910	1098	1197	1147	1509	1419
15	252	—	28	280	392	583	—	93	676	1048	92	1	61	154	398	971	4	77	1052	1509	956	1206	1440	1907
16	332	6	32	370	500	791	8	59	858	1092	6	2	44	52	229	878	7	42	927	1147	1228	979	1592	1376
17	66	—	72	138	426	500	—	160	660	1346	17	5	45	67	254	659	7	95	761	1363	798	828	1722	1617
18	553	—	4	557	573	813	—	30	843	963	EMPTY					EMPTY					1400	—	1536	—
19	EMPTY					EMPTY					231	—	27	258	366	850	—	76	926	1230	—	1184	—	1596
20	358	2	2	362	370	997	23	12	1032	1260	245	1	10	256	378	880	24	24	928	1325	1394	1184	1500	1703
21	97	44	1	142	193	468	89	7	564	778	17	83	3	103	148	653	168	16	837	1175	706	940	971	1323
22	222	29	4	255	281	704	73	30	807	951	7	40	21	68	165	506	69	24	599	722	1062	667	1232	887
31	223	23	3	248	343	825	42	14	881	1226	EMPTY					911	8	17	936	1304	1129	—	1569	—
32	144	80	2	226	305	674	95	18	787	1115	EMPTY					497	107	36	640	984	1013	—	1320	—
33	205	28	3	236	256	683	59	11	753	817	146	30	1	177	191	629	54	8	691	831	989	868	1073	1022
34	114	43	3	160	186	508	85	24	617	741	3	62	5	70	111	502	92	28	622	765	767	692	927	876
35	330	17	3	350	368	924	29	11	964	1017	163	49	2	215	231	803	92	7	902	961	1314	1115	1385	1192
36	446	—	6	452	476	1086	—	16	1102	1166	372	6	10	388	440	1084	9	19	1112	1191	1554	1500	1640	1630

clusions. The differences between the houses having summer alternative water heating using gas or electricity are not so marked as in the "thermal input" comparison, but, nevertheless, there is a definite reduction in coal equivalent requirements due to the addition of these appliances.

So far we have been concerned with the seasonal values of thermal input, but it is interesting to examine the variation with outside temperature during the winter. As has already been demonstrated, the inside temperature falls with outside temperature, so that the increase of thermal input with falling outside temperature is not as rapid as it would be with constant inside temperature. The ventilation rate, too, falls, due to closing of windows, with falling outside temperature, so that again this causes the load to increase less rapidly than might be expected. Fig. 4 shows the site mean thermal input as a function of outside temperature for the two heating seasons. The input increases from about 15 therms per week at the end of the heating season only to about 35 therms in "32 deg. F." weather. Clearly the degree-day method of predicting heat requirements is not adequate for the individual heating of domestic dwellings where normal economic circumstances are exercising a modifying effect. In this graph the points which lie noticeably below the general distribution in the temperature range 47 deg. F. to 57 deg. F. correspond to weeks towards the end of the heating season when there are substantial heat gains from sunshine. This particular point is at present the subject of experimental investigation, and it is unnecessary at the moment to do more than notice the general magnitude of the effect, which implies a heat gain at the ends of the heating season which may be around five therms per week.

Cooking

There is considerable dispute concerning the "equivalence" of gas and electricity for cooking, figures over as wide a range as 12 kWh to one therm to 20 kWh to one therm being current. The Egerton Committee took a figure of 14 kWh to one therm; that is, they assumed that 14 kWh on an electric cooker would perform more or less the same function as one therm of gas consumed on a gas cooker, though they noted that gas cookers are often used for heating small quantities of water. It is, of course, difficult to separate the occasional use of either type of cooker for other purposes from its "proper" function, but two comparisons can be made from the data obtained at Abbots Langley. The mean weekly consumption of all tenants in either year, using either gas or electricity, can be obtained, or alternatively, the comparison can be restricted to those tenants who had a gas cooker in one year and an electric cooker in the other. On the first basis the ratio is 14.9 kWh per therm and on the second 16.3 kWh per therm. The difference is not statistically significant, but it must be remembered that with electric cookers, an electric kettle is generally used in addition. The consumption on the electric kettle is likely to be about three or four kWh per week, so that the overall equivalent figure becomes about 18 kWh to one therm.

The bedroom temperatures, even in unheated bedrooms, have been shown to be not unreasonable, and this is reflected in the low consumption for "topping-up" heating in those bedrooms where this facility is provided. With one or two exceptions, the consumption is less than 10 therms throughout the heating season and is often below five therms. Clearly the consumption for topping-up in bedrooms, even where no background heating by convected warm air is provided, is a negligible fraction of the total consumption. It seems highly questionable whether the provision of built-in appliances for this purpose can be justified in more than one bedroom on economic grounds in view of their infrequent use.

In an analysis of expenditure, listed in Table IV, the effect of the use of the alternative gas or electric water heaters during the second summer is clearly shown by the great increase in the number of houses with low summer expenditure (£5 to £7). Of the annual expenditure, 24 (out of 35) lie below £31, which includes the cost of all space and water heating, cooking, lighting and miscellaneous electrical services and the standing charges for gas and electricity. The weekly variation of site mean expenditure during the winter is shown in Fig. 5; the slight difference between the two years is in accordance with the minor increase in the price of fuel during the two years. For these houses and tenants, a fall in the weekly mean temperature by 10 deg. F. increases the average expenditure by about 3s. 4d. Again the small range between mild and cold weather is remarkable (8s. to 18s.), even when allow-

TABLE IV.—EXPENDITURE.—Abbots Langley, 1948 to 1950

House	Summer 1948 SF £	Gas £	Elec. £	Total £	Winter 1948-49 SF £	Gas £	Elec. £	Total £	Summer 1949 SF £	Gas £	Elec. £	Total £	Winter 1949-50 SF £	Gas £	Elec. £	Total £	Annual 1948-9 £	1949-50 £
9	7.4	3.7	1.8	12.9	18.5	8.3	5.3	32.1	EMPTY				15.4	5.2	3.7	24.3	45.0	—
10	0.9	4.1	1.2	6.2	7.8	11.0	2.7	21.5	0.3	3.7	1.5	5.5	6.8	7.7	4.7	19.2	27.7	24.7
11	3.1	2.7	1.2	7.0	7.2	18.0	3.0	28.2	2.4	2.6	1.3	5.3	7.0	15.9	4.3	27.0	35.2	32.4
12	3.8	1.0	2.7	7.5	8.2	0.8	10.8	19.8	2.5	—	3.4	5.9	8.3	—	15.9	24.2	27.3	30.1
13	5.0	1.1	2.6	8.7	15.4	1.1	5.1	21.6	6.5	0.3	4.1	10.9	18.3	0.7	6.4	25.4	30.4	36.3
14	6.5	—	3.1	8.6	14.9	—	6.3	21.2	4.1	—	2.9	7.0	16.8	—	6.0	22.8	29.8	29.8
15	4.3	—	3.2	8.5	9.8	—	9.8	19.6	1.6	0.3	6.5	8.4	17.8	0.5	8.7	27.0	28.1	36.5
16	6.1	1.2	3.5	10.8	14.3	1.2	6.8	22.3	0.1	0.3	5.0	5.4	17.5	0.7	5.3	23.5	33.1	28.9
17	1.2	—	6.8	8.0	9.2	—	15.9	25.1	0.4	0.5	5.3	6.2	12.1	0.7	10.3	23.1	33.1	29.3
18	10.3	—	1.3	11.6	15.0	—	4.2	19.2	EMPTY				EMPTY				30.8	—
19	EMPTY				EMPTY				4.4	—	1.3	6.7	15.9	—	8.6	24.5	—	31.2
20	6.7	0.3	1.2	8.2	18.5	1.7	2.7	22.9	4.5	0.2	1.9	6.6	15.6	1.8	3.8	21.2	31.1	27.8
21	1.7	3.1	1.1	5.9	8.6	6.3	2.3	17.2	0.3	5.0	1.1	6.4	11.9	9.7	3.2	24.8	23.1	31.2
22	3.8	2.3	1.3	7.4	11.9	5.1	4.3	21.3	0.1	2.8	3.0	5.9	9.2	5.0	3.8	18.0	28.7	24.6
31	4.2	1.9	1.2	7.3	15.2	3.6	2.9	21.7	EMPTY				16.5	0.8	3.2	20.5	29.0	—
32	2.8	4.6	1.2	8.6	12.3	6.2	3.2	21.7	EMPTY				9.1	6.7	4.9	20.7	30.3	—
33	3.4	1.9	1.2	6.5	11.2	4.0	2.6	17.8	2.7	2.0	1.1	5.8	11.0	3.8	2.4	18.2	24.3	30.1
34	2.8	2.9	1.2	5.9	7.8	5.6	3.7	17.2	—	3.9	1.5	5.4	8.3	6.1	3.2	18.6	23.1	24.0
35	5.0	1.2	1.2	7.4	14.5	2.2	2.6	19.3	2.6	3.3	1.2	7.1	13.1	6.2	2.3	21.6	26.7	28.7
36	8.4	—	1.4	9.8	19.7	—	3.1	22.8	6.1	0.4	1.8	8.3	17.8	0.8	3.4	22.0	32.6	30.9

ance is made for standing charges and such matters as cooking and lighting.

Space and Water Heating

Little data exist on the expenditure of fuel by the occupants of local authority houses, and despite the limited "sample size" the results are of value as a basis for comparison of the costs with individual heating methods and central heating or district heating. For this, the average weekly cost of water heating and space heating only, throughout the year, is required. The figures, on an annual basis, have therefore been deduced for the experimental houses and are presented in the diagram in Fig. 6. In this, the vertical axis gives the number of observations (i.e. one house in one year), for which the expenditure is less than the value given on the horizontal scale. Thus 50 per cent. of the observations were less than 7s. 9d. and 90 per cent. less than 9s. 6d. From an economic point of view, a weekly charge of less than 9s., and preferably less than 8s., would seem to be the desirable objective where district heating is used. It may certainly be argued that the service provided for the charge with district heating can be higher than with individual heating methods, but these figures give some indication of the amount that local authority tenants are able or willing to spend on space and water heating.

The cost of cooking by gas or electricity can easily be seen from the consumption figures given earlier. If gas is 1s. 3½d. per therm and electricity ½d. per kWh, the cost of cooking by gas is likely to be a little cheaper than by electricity, but the difference is slight.

An examination of ventilation rates shows that with heat costing in the region of 8d. to 10d. per therm the cost of ventilation is around 5s. per week and may obviously be considerably more. The need for ensuring the fit of doors and windows, and encouraging the occupants to exercise some restraint in excessive window opening, is only too apparent.

An examination of the "system efficiency" shows that the centrally heated group has a system efficiency around 60 to 70 per cent., while the other group (particularly the combination grates) is well below the average efficiency as space heaters. Nevertheless, the apparently satisfactory position of the centrally heated group should not be taken as implying that this is the "best" way of heating small houses. The high capital cost of the installation, the use of sized anthracite in the boilers and the indication that the house temperatures are higher (and the heat requirements consequently greater) cannot be ignored. It would appear that where it is necessary to cook by solid fuel, for example, in rural areas, the free-standing cooker or possibly the back-to-back types are more satisfactory than combination grates. This is certainly the indication technically and the opinion of the tenants at Abbots Langley confirms this, but indicates further a strong user preference for a free-standing rather than a back-to-back cooker.

The rest of the houses, lying between 40 per cent. and 60 per cent. or 65 per cent. efficiency, are the ones from which the final selection of "best" heating systems must be made. It is important to notice that this group, containing as it does open fires (with and without boilers), stoves, etc., indicates once more that the efficiency of domestic space heating, where flues are within the house, is well in excess of the figure of 20 per cent. which is so often quoted. It is important to note that this 20 per cent. is the test-bench radiant efficiency of an open fire and makes no allowance for fortuitous heat gained by convection from the surround of the fire and from the flue which makes a contribution to the background heating of the house.

Conclusions

Conclusions affecting heating and house design have been summarised below for convenience.

(1) *Construction.* The house should be insulated to *U* values between 0.20 to 0.25 B.T.U. per sq. ft. hr. deg. F. This may be achieved for the walls by an unventilated cavity construction with a brick outer leaf and light-weight concrete (such as foamed slag or clinker) for the inner leaf. These constructions are little, if anything, more expensive than 11-in. cavity brickwork ($U = 0.30$).

U values in the required range for the ground floor are achieved by a solid floor laid on the ground or, where necessary, over hardcore. The floor finish has only a slight effect on the *U* values.

The pitched roof with tiles or slates on battens with roofing felt over the rafters requires additional insulation to achieve *U* values in the range 0.20 to 0.25, and this may be provided by adding a material such as glass silk, slag wool or aluminium foil laid over, or preferably between, the ceiling joists.

(2) *Windows and doors.* The windows and doors should fit as well as possible and external doors should be weather-stripped.

(3) *Flues.* No flues should be on an external wall.

(4) *Space Heating.* The main space and water heating load in winter should be taken by a single solid-fuel appliance in localities where gas or electricity is available for cooking. The solid-fuel appliance may be some version of continuous burning open fire with back boiler, or inset or free-standing stove with boiler. The back boiler should preferably be of sufficient size to provide both domestic hot-water supply and heat about 30 sq. ft. of radiator surface, and the radiators should be placed in downstairs rooms, such as a kitchen or dining space. If the boiler is not of sufficient size to heat adequate radiator surface then the appliance should provide convected warm air, and this should be supplied to the room in which the appliance is situated or to an adjacent downstairs room, rather than to bedrooms on the upper floor. In one bedroom, at least, facilities should be provided for the use of either a gas or electric fire, or where these fuels are not available an additional solid-fuel appliance should be provided.

(5) *Water Heating.* Electric immersion heaters or gas multi-point heaters or circulators are desirable additions for summer use. Thermostatic control is desirable for electric immersion heaters. A somewhat less satisfactory alternative is to use the living-room appliance to supply hot water for baths, and provide only a gas or electric sink heater in addition.

(6) *Insulation of Storage Tanks.* The hot-water storage tank should be lagged with 1-in. of insulation. Where the storage tank is to be used in conjunction with a gas circulator or electric immersion heater in the summer, 3 in. of insulation should be used, and a removable cover provided for the top.

If the cold-water tanks and water pipes are placed in the roof space, the ceiling insulation should be carried over the tank and no insulation should be placed immediately below it.

Water pipes should be kept away from external walls, and the whole of the plumbing layout should be as compact as possible. Flow and return pipes from the heating-boiler should be lagged with 1-in. insulation.

(7) *Cooking.* Cooking should be done by gas or electricity where this is available. Solid-fuel cookers, preferably of the free-standing type, will be used in rural areas where gas or electricity is not available or in urban areas where there is a traditional preference for cooking by solid fuel.

(8) *Bedroom Ventilation.* Bedrooms without flues may be vented to a ventilated roof space by an opening of 30-sq.-in. free area in preference to wall air bricks.

NON-TRADITIONAL HOUSES

A Scottish Report

THERE is no reason why Scottish local authorities should not go on building permanent non-traditional houses. These houses have no serious constructional defects and satisfactory results can be achieved by the full use of the present system of safeguards. This is the main conclusion of a report by the Scottish Housing Advisory Committee on the "Design and Workmanship of Non-traditional Houses" which was published on April 2 (H.M.S.O., price 1s. 6d.). The report has been commended to local authorities by the Secretary of State.

Some defects, say the committee, could have been avoided by good supervision by local authorities' architects and clerks of works. Bad workmanship was responsible for a considerable number of defects and the only remedies are clear instructions and close supervision. But no attempt should be made to reduce the speed of work or discourage incentive schemes. Training courses for foremen and clerks of works are valuable and should be supported by both sides of the industry.

The committee approved a suggestion by the Department of Health that a Scottish Examination Panel should be set up, on which local authorities would be represented, and which would take the responsibility for approving the design of non-traditional houses.

Only a little over one-third of all Scottish local authorities responded to the committee's invitation to give evidence about defects which they had found in non-traditional houses. "No defects appeared to be so serious as to render any house permanently unfit for habitation, and it is doubtful whether any were a cause of lasting inconvenience to the tenants." The committee did not, however, ignore the temporary inconvenience caused to tenants by remedial measures, some of which entailed the removal of tenants from their houses. But the importance of the serious defects lay rather in the prospect of heavy maintenance expenditure.

The committee's general conclusion was "that the number of serious defects submitted in evidence was small in relation to the number of houses built; that the desire for

speedy erection was in some measure responsible for the fact that some defects were not detected earlier; and that, generally speaking, satisfactory results could be attained by making full use of the present system of safeguards in accordance with our recommendations."

The committee approve the Government's present policy, which is not to guarantee programmes to individual promoters, "as this removes their chief incentive to set a high standard."

The proposed Scottish Examination Panel should not normally approve a design before a prototype has been erected and inspected at all stages of construction. If the feature tested is in the exterior final approval should not be given for a year to test the effects of weather.

The "maintenance period," during which contractors are obliged to make good, without charge, defects due to bad workmanship or materials, should continue to be 12 months. The committee thought that there was also a general obligation on the contractor to make good work which is later found not to be in accordance with the contract.

A large number of the defects which were reported in non-traditional houses were of the kind which can, and do, occur in traditional houses. The committee found it difficult to distinguish precisely between traditional and non-traditional houses, since innovations in structural design or the use of materials were becoming less common. This was partly due to the fact that features like "No-fines concrete" and copper roofs, once regarded as experimental, were now generally accepted as sound traditional practice. Some of the post-war innovations had now been abandoned by contractors in favour of orthodox methods "perhaps because they were substituted for materials which are no longer scarce, or perhaps because the contractor was responding to criticisms of the innovations." The real difference, in the committee's view, lay between houses designed for a single local authority by their own architect, and houses built to a uniform plan by a large contractor in the area of any local authority who wanted them. Either of these types might have unorthodox or experimental features. But the committee's suggestion that "non-traditional" houses should be described as "standard" houses, and other houses as "locally-designed" has not been accepted by the Secretary of State.

HOUSING PROGRESS REPORT

1,000,000 Mark Reached

THE HOUSING SUMMARY presented to Parliament, on April 6, by the Minister of Local Government and Planning and the Secretary of State for Scotland, shows that the number of permanent houses completed in Great Britain during February was 13,984 compared with 13,150 in January.

The total number of houses completed under the post-war programme is now 1,005,798 (848,652 permanent and 157,146 temporary).

During February, homes were provided by new building, repair of uninhabitable houses and conversion for 14,767 families, compared with 14,112 in January and 16,749 in December. This brings the total number of families rehoused by these methods under the post-war programme to 1,289,826. This total does not include homes provided in service camps or requisitioned houses.

IN PARLIAMENT

Buildings on Clapham Common

SIR HERBERT WILLIAMS asked the Minister of Local Government and Planning, on April 3, when planning permission was granted for the permanent buildings now being erected on Clapham Common.

MR. DALTON said these were temporary buildings, for which, under the Public Works (Festival of Britain) Act of 1949, planning permission was not required.

Licensable and Non-Licensable Works

MR. DEREK WALKER-SMITH asked the Minister of Works, on April 3, what were the tests used by the officers of his department to distinguish between licensable and non-licensable works in the interior of buildings for the purposes of Defence Regulation 56A.

MR. STOKES said in the vast majority of cases the licensable work was clearly distinguishable, but where any doubt arises his officers could obtain legal advice.

Government Departments' Form of Contract

On April 3, MR. WALKER-SMITH asked the Minister of Works how far there was uniformity in respect of the form of building contract used in connection with work for the various Government departments.

MR. STOKES replied that all the principal Government departments placing building contracts used the standard General Conditions of Government Contracts for Building Works (Forms CCC/Wks/1 or 2).

Apprentice Master Scheme

On April 5, MR. JAMES HUDSON asked the Minister of Works if he would make a statement about the future of the Apprentice Master Scheme which was sponsored by his department.

MR. STOKES said that the Apprentice Master Scheme was instituted in 1945, on the recommendation of the Building Apprenticeship and Training Council, as an emergency measure to assist recruitment to the building industry at a time when the number of boys wishing to enter the industry and needed to maintain its manpower exceeded the number of normal vacancies for apprentices. Over 6,000 boys had been trained under the scheme and absorbed into the industry, and over 2,000 houses had been built. The Ministry of Works had borne the difference between the actual cost of work under the scheme, and the cost which would have been incurred had the work been done normally by competitive tender with the usual complement of adult labour.

The scheme was inaugurated as a temporary measure to meet immediate post-war needs. In view of the extent to which it had by now served its purpose, and of the calls of the defence programme on Government expenditure, it had been decided not to put in hand further works under the scheme after March 31, 1951, and to bring the whole scheme to a conclusion by March 31, 1952. The building industry had been invited by the Building Apprenticeship and Training Council to consider, while the present scheme was running down, the establishment of an alternative scheme of its own.

See us at Stand No. B.500, B.I.F., Birmingham

HOUSING CENTRE'S PROGRAMME

Statement to Minister of L.G. and P.

IN a statement on their housing programme which has been submitted to the Minister of Local Government and Planning, the Housing Centre Trust say that every effort must be made to avoid a reduction in the number of new dwellings to be erected but that their size and standard should be more closely related to the needs of the tenants.

The immediate attention of the Government and local authorities is invited to the following points "in the light of the present serious housing situation."

(1) The number of new dwellings must not be reduced. (2) Existing housing property must be maintained and adapted to avoid further loss of habitable dwellings. (3) Local authorities should be further encouraged to provide more dwellings of different sizes within their allocation of capital expenditure. They should provide dwellings for households of two and three persons where by doing so a greater number of separate households can be satisfactorily housed.

(4) Local authorities should be encouraged to build to simpler standards. (5) The first claim on public funds must be for housing those most in need. This will necessitate the more extensive use of rent rebate systems. Dwellings should also be provided for those able to pay economic rents. (6) The Rent Acts must be revised to allow increase in rent related to the cost of repairs. Other anomalies should be considered at the same time and a thorough overhaul of these Acts must not be postponed any longer.

(7) A national non-profit making association should be set up with official backing and assistance from public funds to repair, maintain and manage property no longer in a position to attract private enterprise. (8) No one should be disqualified from being allocated a dwelling owned by the local authority because he has not previously resided in the area, but an occupational qualification should be substituted for those who have not previously lived there.

(9) Local authorities should use greater discretion in the allocation of licences for private building. (10) New Towns should be given every opportunity to enable them to build speedily to relieve central congestion, and at the same time the redevelopment of central areas should be energetically carried out.

SUPPLY OF RAINWATER GOODS

Report of Monopoly Commission

EXAMINATION of the supply of cast-iron rainwater goods by the Monopolies and Restrictive Practices Commission has led the Commission to conclude that both the manufacturing members of the British Ironfounders' Association, and most of the merchants handling these goods, so conduct their efforts as to restrict competition in connection with the supply of rainwater goods.

In their Report (Stationary Office, 3s. 6d.) the Commission state that in their assessment of the effect of the restrictive practices on the public interest they were principally concerned with the so-called rainwater agreements system operated jointly by the manufacturers' and merchants' associations, which set up a minimum-price ring covering nine-tenths of the trade, and are supported by exclusive dealing arrangements. These exclusive dealing arrangements mean that in the case of the manufacturer he may give merchant terms only to signatories, and the association rebate only to members of the merchants' associations; and in the case of the merchant that he may buy only from B.I.A. members, that is, that he may not buy on any terms from non-signatory foundries and may not handle imported goods.

The Report records that in 1949 the members of the B.I.A. provided 93.3 per cent. by weight of all rainwater goods supplied in this country by manufacturers, and a similar figure is assumed for 1950. In addition, about two-thirds of the total supplies of rainwater goods in the United Kingdom were supplied by merchant signatories to the rainwater agreements.

Submission by the Trade

The B.I.A. and the merchants' associations submitted to the Commission that the rainwater agreements were essential to assure a fair reward to all those engaged in the supply of rainwater goods and to maintain a proper standard of quality and service. The Commission were not disposed to accept this contention, and came to the conclusion that the operation of these provisions in the system of the rainwater agreements was contrary to the public interest in certain important respects, namely:—

(1) Manufacturers and merchants who do not subscribe to the agreements are excluded from a share in the great bulk of the trade, while those who have subscribed cannot withdraw their support without seriously jeopardising their business.

(2) Owing to the operation of the minimum price agreement, the introduction of low cost methods of production is retarded, since a manufacturer after signing the agreements cannot count on the market expansion which lower prices could have secured for him and which might be necessary to justify the commercial commitments involved; while, as a non-signatory, he would be unable to get adequate distributive outlets.

(3) No adequate incentive is given to buyers so to bulk and standardise their demands as to encourage foundries to specialise their production; nor is there any means by which any consequential saving, either in production or in distribution costs, can be passed on to the consumer. (That such a method of trading may result in substantial economies has been established by the history of Associated Builders' Merchants Ltd., and that the same principle has application at the present time is indicated by the evidence of the Railway Executive.)

It was found that while there were wide variations in the profits yielded to individual foundries by the system of common minimum prices established by the rainwater agreements, average profits had not been high in this industry. The commission were inclined to think that there would in any case be little likelihood of their reaching excessive levels in the long run, even if the rainwater agreements were to be left unchanged, because of the extent of competition from goods of alternative materials such as asbestos cement, aluminium and pressed steel. At the present time, there was the further safeguard of Government price control. They also noted that the B.I.A. had said that in the event of statutory price control being abandoned, they would be willing to submit their prices for periodic review by the Government if the rainwater agreements were allowed to continue in force.

Recommendations

The report recommends that those concerned should amend their trading arrangements in such a way as to meet the objections outlined above, and that discussions should take place with the Commission for this purpose. In particular, it is recommended that there should be no discrimination by foundries either as regards supplies or as regards trade terms on the ground that a merchant had or had not entered into an agreement with the foundries, or was or was not a member of a trade association; and that merchants who bought from non-members of the B.I.A., or who handled imported rainwater goods, should not as a result be deprived of supplies from members or obtain them only on less favourable terms.

"Our comments on the practices which operate or are likely to operate in this industry, and the conclusions we have reached thereon, in no way detract from our appreciation of efforts made by individual merchants and by foundries inside and outside the B.I.A. to meet difficulties which arose between the two world wars and since 1945," the Commission state. "Great efforts have been made to rebuild the industry in recent years in the face of severe and persistent shortage of the traditional types of labour, and we note that considerable progress has been made (particularly in the last five years) in the introduction of mechanised methods of manufacture on which new and unskilled labour can be readily trained. Three concerns (including one non-B.I.A. foundry) are going ahead with the development of centrifugal casting. Half the total output of the goods is now produced by mechanised means and further schemes are in hand. Large sums of money have also been spent on training schemes aimed at rebuilding the labour force of floor moulders and on improving working conditions. A considerable contribution has thus already been made by the industry to the important task of expanding production.

"It seems to us apparent, however, that more remains to be done if the industry is to adjust itself to the technical changes now taking place and foreshadowed, and to meet the serious problem of retaining and securing sufficient recruits for the foundries. It has been impressed upon us during the course of this investigation that mechanised methods of production, whether the sand-slinger method which produces substantial economies at least in man-hours, or the centrifugal method which should, we understand, produce substantial economies both in labour and in cost, can only be adopted and effectively used by large foundries able to concentrate on long runs of standardised products. It by no means follows that there will not remain a place for smaller foundries but it seems clear that the maximum production of standardised lines will demand an increasing degree of mechanisation."

The Commission add that the recommendations made for the amendment of the rainwater agreements demonstrate the importance they attach to the "speedy and unfettered development of these newer methods of production, as well as to flexibility and economy in methods of distribution."

The Trade's Comment

Mr. A. E. L. Robey, president of the Building Industry Distributors, and Mr. W. S. Shirra, chairman of the Distributors of Builders' Supplies Joint Council, representing the builders' and plumbers' merchants of the country, have made a joint statement emphasising that trade agreements led to stable prices and wages and a steady flow of reasonably priced goods of high quality. Those agreements were therefore in the interests of both the worker and the customer.

The Commission's Report did nothing to lead them to alter their opinion, which was based on years of trading experience. All the facts were known before, and deductions from them were a matter of opinion.

INQUIRY BUREAU

R.I.B.A. Form of Contract

Q.—Clause 22 of the R.I.B.A. Form of Contract deals with "Nominated Suppliers," and lays down that they are to be paid 30 days after the end of the month of delivery. Clause 12 makes the contractor responsible for any defects within the Liability Period of the contract. In some cases nominated contractors agree to replace defective goods if they are recovered and sent to their works, and in other cases they disclaim responsibility.

In the first case, who has to bear the cost of removal, carriage and refixing of the replaced article? In the latter case, who is responsible for removing articles which develop defects within the Liability Period?

As the whole of the conditions, specification, etc., are fixed by the architect with the Nominated Supplier, and the contract terms only give power to the contractor to object if the Nominated Supplier refuses to give discount for cash payments, he would appear to be placed in a very invidious position.

E. and T.

A.—A legal correspondent writes: It is clear that the responsibility for defective materials and goods supplied by Nominated Suppliers (i.e., named by the architect) is upon the contractor under the Defects Liability Clause (12). The question of the cost of removal, carriage, and refixing, etc., of defective articles, as now specifically dealt with in the contract itself (assuming the R.I.B.A. form) must then be a matter of arrangement between the person ordering the goods and materials (often the contractor) and the Nominated Supplier. In this way the contractor can protect himself; otherwise he will have to bear all costs of "making good" under clause 12.

In regard to the observation in the last paragraph I cannot agree that the contractor is in an "invidious position," though I can quite understand the reluctance (under certain circumstances) of contractors to have dealings with Nominated Suppliers with whom they may have had disputes and differences. I think it can be said that the system embodied in the R.I.B.A. contract works satisfactorily on the whole.

Delay in Completion of Work

Q.—Assuming lump sum contract on R.I.B.A. Articles of Agreement if, due to dilatoriness, negligence or lack of proper organisation on the part of the builder, work is not finished by the contract completion date (clause 16 as extended by clause 18) and the employer does not wish to enforce the penalty clause (17), can the employer legally refuse to pay increases in labour and materials which have taken place since the date due for completion? For example, if the completion date is February 1, 1951, and the work is not actually completed until May 1, 1951, is the employer entitled to refuse to pay claims for wage increases under clause 25 which have been ½d. per hour since February 5, 1951, and a further 2½d. per hour since March 5, 1951?

H. M.

A.—A legal correspondent writes: This is an interesting point, and, in the absence of a legal decision, is an arguable one.

It can be said that as the employer has abandoned his rights under clause 17, and as under the circumstances the architect could not give an extension of time under the contract (as the delay was clearly due to the contractor's default), during the period between the time of completion under the contract and the actual time of completion the works were "still in progress" and that therefore the contractor could take advantage of the fluctuations clause.

On the other hand, as a general principle of law, a person in default (as the contractor is) ought not to be allowed to take any benefit resulting from such default. On balance, I incline towards the latter view.

Condensation from Gas Boiler Flue

Q.—Dark brown stains have appeared on the plaster of a bedroom in the angle where the wall meets the ceiling. The flue from the kitchen boiler below runs up behind the bedroom wall in this particular place. The original solid fuel burning boiler was removed about a year ago and a gas boiler installed in its place. The roof, lead gutter, flashings, etc., above are all in perfect order and there is a proper double slate damp course in the stack. The stack is built in soft red brick bedded in lime mortar, which appears to have been rather a weak mix and is now badly pitted.

My theory is that the recent heavy continuous rain has penetrated right through the stack to the flu and has come into contact with the residue of soot deposit in the flu, forming a dark brown fluid which, lower down, has penetrated the flue to the bedroom plaster. I also suspect that under certain atmospheric conditions condensation occurs inside the flue from the gas fumes.

To cure the former I am recommending that the stack, after drying out naturally by means of sun and wind, be re-pointed in cement and then treated with two coats waterproofing liquid. To overcome the condensation from the fumes I am advocating that a piped asbestos flue be formed inside the existing.

Before proceeding I should be glad if you could offer any observations on the problem.

A. B.

A.—The brickwork of the chimney flue is usually 4½ in. thick and should be built with lime mortar, raked out joints about ¾ in. deep. These joints should be pointed with Portland cement and washed sand about 2 and 1 mix; the type of pointing should be weather pointing. If the bricks are very absorbent, in place of applying a waterproofer direct on the brick I suggest a rendering of two coats of Portland cement and sand. Incorporate a waterproofer and finish in pebble dash. Attention should be given to the flashings.

With regard to the staining coming through the wall, this is undoubtedly caused through the flue being used for the gas boiler. There would be a greater collection of vapour owing to the sudden increase in temperature of a gas boiler compared with a coal fire, as heretofore, and in consequence the soot and the pargetting would become saturated and probably cause the staining through defective joints. The present size of the 9 in. by 9 in. flue should be reduced to 6 in. diameter by using a pipe made of compressed asbestos throughout the length of the chimney and should, I suggest, have a suitable terminal. Fix the pipe equally in the flue. The object of the terminal is to stop rain and to divert any downdraught. Consult the gas company as to the proper terminal.

G. W. H.

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TRADE NEWS

British Museum Microfilm Annexe

We have been informed that painting in connection with the new British Museum Microfilm Annexe, Colindale (illustrated in our March 23 issue) was carried out by T. H. Kenyon and Sons, Ltd.

Standardisation of Brush Size Numbers

The British Brush Manufacturers' Association of 80 Coleman-street, London, E.C.2, have informed us that they have formulated standards for the size numbers which are used to describe certain kinds of brushes. Copies of these "B.B.M.A. Standards" and further details can be obtained from the Association at the above address.

An Appointment

Messrs. Walter Lilly and Co., Ltd., builders, of Westminster, have appointed Mr. Henry J. Scholey to the position of contracts manager. A Canadian by birth, Mr. Scholey has been engaged on many major projects throughout the United States and Canada, combined with a considerable experience of the construction industry in England during the war years.

Tile Catalogues

Richard Tiles, Ltd., Tunstall, Stoke-on-Trent, are about to issue to the trade two new Catalogues, R.T. 55—"Recesso" Built-in-Fittings and R.T. 59, which shows 12 of their latest designs in tiled fireplaces. Three other catalogues, R.T. 39—Coloured Bathroom Tiling, R.T. 52—Wall and Floor Tile Fittings, and R.T. 53—Tiled Fireplaces, have already been issued and are still current.

Heavier-type Casement Window

To meet the requirements of those who desire casement windows of heavier sections, the English Joinery Manufacturers' Association have drawn up, in conjunction with the B.S.I., a new specification for E.J.M.A. standard casement windows. Copies of the new specification, which will be essentially the same as the new B.S.S. on casement windows which, it is understood, will be published soon, have been sent to all housing authorities in the country.

NEWS IN BRIEF

Code of Practice

The Council for Codes of Practice for Buildings, Lambeth Bridge House, S.E.1, have issued a British Standard Code of Practice, draft for comment, "Installation of Optical Projection Equipment in Educational Establishments," price 5s.

Local Government N.J.C. Chairman

Sir Thomas Phillips, G.B.E., K.C.B., has been appointed by the Minister of Local Government and Planning to be chairman of the National Joint Council for Local Authorities' Administrative, Professional, Technical and Clerical Services. The appointment is made by the Minister at the request of the council under the terms of its constitution.

Synthetic Resin Adhesives

Aero Research, Ltd., Duxford, Cambridge, propose to hold a Summer School on "The Technology of Synthetic Resin Adhesives" from September 23-29, next. There are two courses in the Syllabus; one for the woodworking industries and one for engineering and other industries. The fee for the course is £10 10s. inclusive of accommodation, meals and transport. Brochures, syllabus cards, and application forms can be obtained from the above address.

Death of Mr. Sidney Wolfe

Mr. Sidney Wolfe, until recently chairman of Wolf Electric Tools, Ltd., has died in his 80th year. Mr. Wolfe, who founded the company in 1900, was a trained engineer and designer, and his keen foresight led him to see the future possibilities of portable electric tools in the engineering industries.

"Modern Building" Exhibition

The Ministry of Works, in association with the building industry, is to stage a "Modern Building" exhibition at Little Roodee, Chester, from June 22-30. The display of mechanical aids to building—suitable for the small builder as well as the large contractor—will be the most comprehensive to be assembled in this part of the country. Any manufacturer of mechanical aids who wishes to avail himself of the limited stand space not yet allocated, should write immediately to: The Chief Plant Adviser, Ministry of Works, Lambeth Bridge House, London, S.E.1.

Technical Bulletin

The Technical Information Service of the Furniture Development Council has issued the first number of its Technical Bulletin. This bulletin consists of summaries of articles and reports which have recently appeared in the trade, technical and scientific Press, or which have been received from manufacturers and other sources in this country and abroad. The subjects covered by these summaries include timber, plywood, plastics, woodworking machinery, finishing processes, upholstery materials and hardware. At present, it is intended to publish the bulletin at two-monthly intervals. Copies are being sent to each firm whose name appears on the register of the Furniture Development Council, but they are also available on a subscription basis at 30s. for the first six issues.

The Late Mr. Fred Norman

The death has occurred of Mr. Fred Norman, F.I.O.B., managing director of Ekins and Co., Ltd., builders, of Hertford. Mr. Norman had been a director of the firm since 1919 and managing director for the past 20 years.

Builder as Mayor

Councillor Ronald A. Robertson, of the firm of Robertson and Charles, Ltd. builders, of Clapton, is to be the next mayor of Stoke Newington. He is, at present, deputy mayor and chairman of the works and building committee.

L.M.B.A. Apprenticeship Drive

To help bring the attractions of apprenticeship in the building industry to the notice of prospective apprentices, the L.M.B.A. has organised a speakers' panel, drawn from L.M.B.A. members and representatives of the operatives and foremen, to address Youth Employment committees. An encouraging start has been made, and members of the panel have already addressed several of the committees in London.

Builders at Golf

The Spring meeting of the Building Alliance Golfing Society will take place on the courses of the Sunningdale Golf Club, on Tuesday, May 1, next. Singles (medal play) and fourball foursomes (medal play) will be played. Prizes will be awarded for each event including a scratch prize for the singles. Concurrently with the singles, the "Dyke" cup will be played for. Entry forms can be obtained from Mr. David T. Hill, W. G. Hill and Son, Monument Station-buildings, King William-street, E.C.4. Closing date for entries, April 19.

In the annual Golf match between the R.I.B.A. Golfing Society and the Building Alliance Golfing Society, held at Wimbledon, the architects were on the losing side by scoring 11½ points to their opponents' 15½. This was the reversal of last year's result when the architects came out on top.

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THE SCOTTISH BUILDER

NEW BUILDINGS

Aberdeen.—Corporation propose new nursery infants' school to be erected at an est. cost of £44,527 at Cornhill. Architect is Mr. Alexander B. Gardner, F.R.I.B.A., Municipal Offices, Bridge-st., The Castlegate, Aberdeen.

Ayr.—Plans prepared and approved by the Church of Scotland for new church and halls to be erected at an est. cost of £15,500 at Thorney Flat.

East Kilbride.—Approval given to New Town Development Corporation for erection of new 500,000 sq. ft. jet engine factory at East Kilbride.

Edinburgh.—Corporation has plans in hand for the erection at Edinburgh-rd. of a new Remand home for the Education Authority. Architect is M. A. G. Frogget, A.R.I.B.A., Municipal-bldgs., Parliament-sq., High-st., Edinburgh.

Edinburgh.—Six-storey office block for the Sun Life Insurance Co., Ltd., Threadneedle-st., London, E.C., to be erected at Frederick and George-sts. Architect is Mr. T. Waller Marwick, A.R.I.B.A., St. Colne-st., West End, Edinburgh.

Elgin.—W. K. Kininmonth, F.R.I.B.A., 16, Rutland-sq., Edinburgh, has been appointed architect by T.C. for proposed new town hall at Elgin.

Glasgow.—Plans to be prepared for new buildings to be erected for the Regent Oil Co., Ltd., 22, Hope-st., Glasgow, W.C.2, at Port Dundas-rd., from plans by the company's own staff architects at 117, Park-st., London, W.1.

Glasgow.—Plans to be prepared for new primary school at Startpoint-st., Cranhill, for which the architect is Mr. John MacNab, F.R.I.B.A., 129, Bath-st., Glasgow, W.C.2.

Glasgow.—Plans to be prepared for the Law, Union & Rock Insurance Co., Ltd., Chancery-la., London, for alterations and additions at 108 and 110, West George-st. Architects are Wylie, Shanks & Wylie, F. & A.R.I.B.A., 120, Blythswood-st., Blythswood-sq., Glasgow, W.C.2.

Glasgow.—Plans to be prepared for new buildings for the Perfection Bedding Co., Ltd., at their premises at Queenslie Industrial Estate, The Edinburgh-rd. Architects are George A. Boswell & Partners, F.R.I.B.A., 256, West George-st., Blythswood-sq., Glasgow, W.C.2.

Inverness.—Corporation to erect three blocks of flats and 18 houses at Gilbert-st., for which the architect is William W. Connar, F.R.I.B.A., Municipal-bldgs., Inverness.

Renfrew.—Corporation propose to erect 52 houses at Cockles Loan housing site. Architect is Mr. Archibald Allan, M.Inst.C.E., Municipal-bldgs., The Cross, Renfrew.

FUTURE CONSTRUCTION

PUBLIC APPOINTMENTS

Full details of Public Appointments open will be found in the Advertisement pages of this and previous issues.

CONTRACTS OPEN

For some contracts still open but not included in this list see previous issues. Those with an asterisk are advertised in this number. The dates at the heads of paragraphs are those for the submission of tenders; a dagger (†) denotes closing date for applications; the name and address at the end refer to the person from whom particulars may be obtained.

BUILDING

APRIL 19.

***†North-East Metropolitan Regional Hospital Board.**—Sanitary annexes to ward block at Brentwood Mental Hospital. (Ref. No. 23A/6). Est. cost £21,000. Secretary, 11a, Portland-pl., London, W.1.

***†North-East Metropolitan Regional Hospital Board.**—Construction of two low-grade blocks at South Ockendon Mental Colony. (Ref. No. 26E/1). Est. cost £60,000. Secretary, 11a, Portland-pl., London, W.1.

APRIL 20.

***†Waltham Holy Cross U.D.C.**—Four houses at Princesfield estate. C., Town Hall.

APRIL 21.

***†Caernarvon T.C.**—Six old person's dwellings and one block of six shops and maisonettes at Cae Mur estate. B.E., Guild Hall. Dep. £2 2s.

***†Essex C.C.**—Pair of cottages, Lordship Farm, Writtle. H. Conolly (F.), County Architect, Chelmsford.

***†Hendon B.C.**—48 flats at Kenilworth-rd., Edgware. B.E. & S., Town Hall.

***Ware U.D.C.**—30 bungalows at two sites. E. & S., The Priory. Dep. £2 2s.

***†Whitchurch (Salop) U.D.C.**—38 houses at Sedgeford (East Side). C., Council Offices. Dep. £2 2s.

APRIL 23.

***Bridgwater T.C.**—54 houses at Montacute's Field. B.E., Town Hall. Dep. £3 3s.

***†Gloucester T.C.**—Extension to crematorium at Coney Hill. City A., Suffolk House, Greyfriars.

***†Lee Conservancy Catchment Board.**—35 houses at Blackhorse-la. and Billet-rd., Walthamstow. Ley Colbeck & Partners (FF.), Palmerston House, 51, Bishopsgate, E.C.2. Dep. £5 5s. Tenders by May 17.

***†Middlesex C.C.**—Health clinic at Elers-rd., Hayes, C. W. Radcliffe, C., Guildhall, Westminster, S.W.1. Dep. £2 2s. Tenders by May 21.

***†Middlesex C.C.**—Prefabricated gymnasium,

changing rooms and shower baths at Enfield County School, Holly Walk. Chief Ed. Officer, 10, Gt. George-st., S.W.1. Dep. £2 2s. Tenders by May 21.

Tonbridge (Kent) R.D.C.—46 houses at various sites. E. & S., 48, Pembury-rd., Tonbridge.

*†**Walthamstow B.C.**—Reconstruction of four flats, Westbury-rd., E.17. Boro' Architect. Dep. £2 2s.

APRIL 24.

*†**Bedford T.C.**—Six shops (in skeleton form) with 12 flats over at Mile-rd. B.E. & S., Newnham House, Horne-la. Dep. £3 3s.

APRIL 25.

*Hendon T.C.—Conversion and adaptation of portions of "Hatcroft," The Burroughs. B.E., Town Hall. Dep. £2 2s.

*Macclesfield T.C.—72 houses at Weston. Boro' A., 3, Jordangate. Dep. £2 2s.

*†**Norfolk E.C.**—Improvements at North Lopham County Primary Sch. G. W. Oak (A.), Ed. Architect.

*†**Oldbury T.C.**—92 houses at Brandhall estate. B.S., Municipal Bank-chbrs. Dep. £4 4s.

APRIL 26.

Clutton R.D.C.—20 houses, Winford-rd., Chew Magna, with sewage disposal and road works. Thomas & Morgan & Partners, architects, 23, Gelliwasted-rd., Pontypridd. Dep. £3 3s.

*Ealing Boro'.—24 flats, Northolt Grange, Northolt. C. W. Seddon, B.E. & S. Dep. £2.

APRIL 27.

*Louth T.C.—32 houses with paths, etc., at Eastfield-rd. estate extension No. 4. Vallance & Westwich, White Hart-chbrs., Mansfield. Dep. £2 2s.

*Reigate T.C.—19 pairs of houses at Pendleton-rd. estate extension, Redhill. B.E. & S., Town Hall. Dep. £2 2s.

APRIL 28.

Hyde B.C.—86 houses on the Harbour farm and Cheetham Fold estates. B.S., Municipal-bldgs., Hyde. Dep. £2 2s.

APRIL 30.

*†**Chigwell U.D.C.**—16 flats with 22 maisonettes at North Loughton. C., Council Offices, Old Station-rd., Loughton.

*Weston-super-Mare T.C.—21 lock-up garages at Bournville estate. B.E. & S., Town Hall. Dep. £2 2s.

Wombwell (Yorks) U.D.C.—82 houses on Wilson-st. site. C. Knowles, Town Hall, Wombwell. Dep. £2 2s.

MAY 1.

*Bexley Boro'.—Alterations and additions to mortuary, Council-yd., Bexleyheath. B.E. & S. Dep. £2 2s.

*Thurrock U.D.C.—Reconstruction of portion of public library, Civic-sq. E. Fincham (A.), 9, Palmer's-ave., Grays. Dep. £2 2s.

MAY 2.

*†Wandsworth B.C.—6 flats at Acris-st., 6 at Bar mouth-rd. and 6 at Lambourn-rd. T.C.

MAY 3.

*Eccles T.C.—28 houses at Ellesmere Park. B.E. & S., Town Hall. Dep. £2 2s.

MAY 4.

*†Cambridge T.C.—56 houses at Queen Edith's-way estate. City E. & S., Guildhall. Dep. £5 5s.

*†Cambridge T.C.—16 houses at Coleridge-rd. estate. City E. & S., Guildhall. Dep. £5 5s.

*Surbiton T.C.—Lavatory accommodation at Assembly Rooms, Claremont-rd. B.E. & S. Dep. £2 2s.

MAY 7.

*Liverpool T.C.—Repair and decoration of Rivington Hall and various buildings. Water E., 55, Dale-st. Dep. £3 3s.

MAY 8.

*Sherborne R.D.C.—Six houses at Purse Caundle and five at Ryme Intrinseca. C., Council Offices. Dep. £2 2s.

MAY 9.

*Derby C.B.—12 houses at Kingsway estate. Boro' A., Council House. Dep. £2 2s.

MAY 23.

*Deptford T.C.—Ten shops with maisonettes in blocks of four and six, 8 flats in four storeys and 20 flats in five storeys at New Cross-rd. T.C., Town Hall, S.E.14. Dep. £2 2s.

NO DATE.

*Ongar R.D.C.—14 houses, Shelley estate. E. & S. Dep. £2 2s.

PAINTING, ELECTRIC LIGHTING, MATERIALS, ETC.

APRIL 25.

Preston C.B.—Electrical installation for 118 houses, Larches estate, part 2, Ashton, and 98 houses, Ribbleton Hall estate, Preston. B.E. & S., Municipal-bldgs., Preston. Dep. £2 2s.

*Wallasey C.B.—External painting of 392 houses. Boro' A., Town Hall.

APRIL 26.

*East Grinstead U.D.C.—External painting of 103 houses and two building blocks. S., East Court.

APRIL 30.

*Croydon C.B.—Painting and decorating houses. Boro' Valuer, 71, Park-la.

MAY 1.

*Kingston-upon-Thames Royal Boro'.—Internal redecoration of 12 flats and external redecoration of 50 houses and flats. B.S. Dep. £2 2s.

*Uxbridge U.D.C.—External painting 262 houses and 60 bungalows. H. E. G. Stripp, E. & S., 263, High-st.

MAY 7.

*Wallasey C.B.—Heating and hot water installation at Eastway Sch. extension. Boro' A. Dep. £1 1s.

ROADS, SEWERAGE AND WATER WORKS

APRIL 26.

Ware U.D.C.—Road works and water mains at Presdales. W. J. Davis, E. & S., The Priory, Ware. Dep. £2 2s.

APRIL 27.

Walsall C.B.—Roads and sewers on the Wolverhampton-rd. Pelsall housing site. B.E. & S., Council House. Dep. £2 2s.

APRIL 30.

Chigwell U.D.C.—Road and sewer works at North Loughton housing site. E. & S., Council Offices, Station-rd., Loughton, Essex. Dep. £5 5s.

Durham C.C.—Supply and laying of about 131,037 super. yds. hot rolled asphalt on various trunk roads. E. & S., 43, Old Elvet, Durham.

MAY 22.

*Hertford B.C.—Roads and sewers, etc., Sele Farm site. E. C. Harris & Ptnrs., quantity surveyors, 3, Bedford-sq., London, W.C.1. Dep. £2 2s.

GENERAL BUILDING WORK

(LONDON)

Chelsea.—Additions.—Plans for 47 garages, two flats, one house, five studios, etc., Cranmer-ct., Sloane-ave., S.W.3, have been approved by B.C. Architect is Gordon Jeeves, F.R.I.B.A., 61, Catherine-pl., S.W.1.

Chiswick.—Offices.—Wayne V. Myers Co., Ltd., 365, Chiswick High-rd., W.4, propose to build office block at Nos. 353-363, Chiswick High-rd., comprising three floors with flats in upper floor. Architects are Dodge & Reid, 72, High-st., Brentford, Middlesex.

Dagenham.—Treatment Centre.—E.C.C. Health Com. propose to erect combined treatment centre on site in Oxlow-la., to cost £17,460.

Dagenham. — Flats. — Norman & Dawbarn, F.R.I.B.A., 5, Gower-st., W.C.1, are architects for 40 dwellings in four blocks at Heath Park estate for B.C.

Ealing.—Home.—Homes for the Motherless, Incorporated, propose to build children's home, etc., at rear of Queen's-walk, W.5. Architects are Alan W. Pipe & Son, 8, Queen-st., Cheapside, E.C.4.

Edmonton.—School.—Plans for a new primary school at Wilbury-way to cost £88,940 have been prepared by C. G. Stillman, F.R.I.B.A., architect to M.C.C.

Finsbury.—Distillery.—Plans have been prepared for distillery and bonded warehouse, offices, etc., at corner of Goswell-rd. and Moreland-st., E.C.1, for Tanqueray, Gordon & Co., Ltd., 132, Goswell-rd., E.C.1. Est. cost., £250,000. Architects are Chamberlain & Willows, 23, Moorgate, E.C.2, and quantity surveyors are E. C. Harris & Partners, 3, Bedford-sq., W.C.1.

Harold Wood.—Day Nursery.—The provision of day nursery for 50 children in Gubbins-la. is proposed by E.C.C. Health Com. Est. cost, £13,172.

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Holborn.—Showrooms, Offices, Etc.—The Building Centre, Ltd., 9, Conduit-st., W.1, is to form a new centre, offices, etc., by conversion of premises, 26, Store-st., W.C.1. Centre's architect is G. I. Goulden, A.R.I.B.A.

Holborn.—Rebuilding.—T. Mortimer Burrows & Partners, L.R.I.B.A., 44, Bedford-row, W.C.1, are architects for rebuilding the remaining part of the Bedford Corner Hotel for R. E. Jones, Ltd.

Kensington. — Reinstatement. — Council of the Royal Albert Hall Corporation, Kensington-rd., S.W, is seeking powers to raise a loan of £350,000 for completion of reinstatement and improvements of their building. Architects are Troupe & Steele, FF.R.I.B.A., 14, Gray's Inn-sq., W.C.1.

Poplar.—Addition.—New operating theatre costing £11,500 is proposed for Poplar Hospital, Bow, E.3, by North-East Metropolitan Reg. Hospital Brd., 11a, Portland-pl., W.1. Board's chief architect is W. G. Plant, A.R.I.B.A.

Romford.—Health Centre.—E.C.C. Health Com. propose to erect health centre to serve Harold Hill L.C.C. housing estate at Romford. Est. cost, £31,219.

Southwark.—Rebuilding.—Premises to be rebuilt as off-licence, maisonette, etc., at 60, Great Dover-st., S.E.1, for R. & F. Pavey, 41, Larch-rd., S.W.12. Architect is F. J. D. Daly, A.R.I.B.A., 44, Blackfriars-rd., S.E.1.

Teddington—Extension.—Extension of printing works, etc., at 130, High-st., for Langham Press. Plans by F. W. Holloway, 46, Cambridge-rd.

Upminster.—Treatment Centre.—E.C.C. Health Com. propose erection of combined treatment centre on site at junction of Springfield-gdns. and Corbetts Tey-rd., to cost £12,250.

Walthamstow.—Additions.—Additions, including a large extra high voltage testing station, are to be made to the works of Micanite & Insulators, Ltd., at Blackhorse-la., E.17. Architects are W. G. Phillips & Partners, 14-15, Conduit-st., W.1.

Wanstead and Woodford.—Flats.—U.D.C. approved plans for 30 flats at Snakes-la., Woodford Green.

West Ham.—Additions.—A 2-storey factory block at Marshgate-la., E.15, is proposed by Usher Walker, Ltd. Architects are Ley, Colbeck & Partners, Palmerston House, Bishopsgate, E.C.2.

(PROVINCIAL)

Abergele.—U.D.C. approved plans by Council's Surveyor for the erection of 196 houses on a site bounded by Dundonald, Sydenham and Vaenol-aves., Abergele. R. O. Roberts, surveyor.

Anglesey.—C.C. approved sketch plans for nursery unit at Bronheulog Children's Home, to cost £12,000.

Arnold.—U.D.C. to negotiate with Wates, Ltd., London, for erection of 50 houses at Mansfield-rd., Cross-st. site.

Ashton-under-Lyne.—B.C. approved plans for conversion of mortuary into pathological lab. at District Infirmary, for Ashton, Hyde and Glossop Hospital Management Com.

Bath.—Housing Com. approved plans for 22 flats and 20 maisonettes at Julian-rd.

Bath.—Ed. Com. to make application for sanction of loan of £62,000 for erection of school at Charmouth-rd.

Berwick.—T.C. to erect 31 houses at Spittal and 32 at Tweedmouth.—Northumberland E.C. to erect kitchen and dining-room at St. Mary's C.E. Sch. Cty. A. is W. W. Tasker, Cty. Hall, Newcastle-on-Tyne.

Billingham-on-Tees.—Ravensfield Properties, Ltd., London, are in touch with U.D.C. regarding acquisition of a 99 years' lease of land in Roseberry-rd. development area for a proposed shopping centre. —North-Eastern Housing Association, Metrovick House, Northumberland-rd., Newcastle-on-Tyne, are to erect houses for executive staff of I.C.I., Ltd., in Roseberry-rd. area.

Birkenhead.—H. J. Rowse, Liverpool, is architect for 130 houses (contract 6) at Woodchurch estate.

Birmingham.—E.C. has plans in hand for Bartley Green prim. sch. Architects are Wood, Kendrick & Williams, 57, Colmore-row, Birmingham. The consulting engineer is David W. J. Carrington, 105, Aston-rd., Birmingham.

Blackpool.—Manchester Reg. Hospital Brd. propose new maternity hospital, at £175,000 (commence next year). T. Duffy, Sunlight House, Quay-st., Manchester, architect to board.

Bradford.—T.C. to prepare plans for block of flats, Jermyn-st., Stott Hill.

Brighouse.—B.C. approved plans for extensions to weaving shed and canteen, Victoria-rd., Bailiffe Bridge, for T. F. Firth & Sons, Ltd.—Extensions, West-la., Southowram, for Halifax Tool Co., Ltd.—Extensions, telephone exchange, Leeds-rd., Hipperholme, for M.O.W.

Bristol.—New showrooms, offices, etc., proposed at St. Thomas's-st., for W. & T. Avery, Ltd., Birmingham. Plans by Alex F. French, F.R.I.B.A., Halifax House, St. Augustine's-parade, Bristol.

Bromley.—B.C. is considering detailed plans for section 2, Hayes-pl. Housing estate, comprising 139 dwellings, 17 old people's homes, six shops with maisonettes above. Architects are Dalgleish & Pullen, FF.R.I.B.A., 17, Fitzhardinge-st., Portman-sq., W.1.

Bromley.—B.C. is negotiating with W. E. & S. Rumph (Builders), Ltd., 9, Widmore-rd., for carrying out section 2, Tylney-rd. housing scheme, comprising 24 flats. Architects are H. Payne, Wyatt, Son & Partners, 465, Brixton-rd., S.W.9

Bromsgrove.—R.D.C. approved plans for medical

station at Stoke Works, for I.C.I., Ltd.—Conversion of west wing at Rockingham Hall into flats for Titford Property Co., Ltd.

Bromsgrove.—U.D.C. received final plans from M.W. for new offices at Recreation-rd., for M.n. of Nat. Insurance.—Approved plans for extensions at Worcester-rd., for Bromsgrove Motors, Ltd.

Burnley.—B.C. to prepare plans for extensions to Central Café.

Bury.—Manchester Reg. Hospital Brd. propose cubicilisation of "A" block at Nightingale Isolation Hospital, Elton. Architects, C. B. Pearson & Son, Manchester.

Bury.—E.C. propose extensions to Bury High Sch. and erection of Brandlesholme C.P. School, Sec. Tech. for Boys, and Seedfield Sec. Mod. Schools (1952-3 programme). B.C. approved preliminary layout for houses, Topping Fold site.

Carlisle.—B.C. to prepare plans for adaptation of Dalston Vicarage as a children's home.

Castleford.—U.D.C. are to develop housing estate south of Airedale estate by erection of 100 houses (800 will eventually be built there).

Chatham.—Beverley Investments, Ltd., 38, Upper Grosvenor-st., W.1, received town planning approval for rebuilding of premises, 195-203, High-st. Architect, Peter Temple, L.R.I.B.A., 24, Bryanston-sq., W.1.

Chesterfield.—Holymoorside Methodist Church propose extensions to premises.—E.C. propose infants' and nursery schools at Brockwell- & Storrs-rds. and infant school at Boythorpe (1952-3 programme).—Tennants Brewery Co., propose new public-house at Boythorpe. To seek licence immediately.

Chichester. — South-West Metropolitan Reg. Hospital Board propose extensions and improvements to St. Richard's Hospital. Architects, Saxon, Snell & Phillips, 9, Bentinck-st., W.1.

Coventry.—E.C. propose inclusion of following schools in 1952-3 programme: Broad-la. Sec. (£175,000), Deedmore-rd. Prim. (£53,000), Charter-ave. Prim. (£53,000), Penny Park R.C. Prim. (£46,000). Donald E. E. Gibson, City A.

Crayford.—Roman Catholic Diocese of Southwark to build new school of 120 places, costing about £25,000. Architects are Hudson & Hammond, A.R.I.B.A., 28, Buckingham-st., Adelphi, W.C.2.

Darlington.—E. A. Tornbohm, A.R.I.B.A., Boro' A., has been instructed by Markets Com. to submit plans for erection of new corn exchange.

Derby.—T.C. received approval for improvement of T.T. accommodation at Cattle Market, at £18,500.

Dewsbury.—B.C. received sanction to erect occupation centre for mental defectives at Orchard-st., Savile Town.—B.C. to seek M.O.H. approval for adaptations to "Austin Friars," Springfield-ter.—B.C. approved erection of 260 houses, Chickenley-la. and Wakefield-rd.

Dover.—B.C. propose to erect 32 houses at Buckland estate; 16 at Wycherley-cres., and 38 at Durham Hill.

Durham.—Durham Coal Brd., Newcastle-on-Tyne, are to spend £80,000 improving colliery canteens.

Essex.—Ed. Com. propose erection of new Leyton Harrington-rd. primary school, to cost £95,950.

Essex.—Health Com. propose five ambulance stations in Metropolitan area of Essex, and temporary ambulance accommodation to cost £150,000.

Essex.—Ed. Com. propose erection of following school buildings:—Engineering block at North-East Essex Tech. College and Sch. of Art (£163,866); new Colchester Mayer-rd. prim. sch. (£94,810); new Wanstead Nightingale Junior sch. (£56,900); remodelling of Woodford Cowslip-rd. prim. to provide inf. sch. (£44,700); new Woodford Oakdale-rd. junior sch. (£57,600); new Braintree North inf. sch. (£65,275); new Epping Green prim. (voluntary controlled) sch. (£19,660); new Epping St. John's-rd. inf. sch. (£44,150); new Romford Harold Hill cty. prim. sch. (£105,100); new Romford Harold Hill jun. sch., provisionally known as East sch. (£78,305); new Romford Harold Hill jun. sch., provisionally known as West sch. (£78,305); new Romford Harold Hill inf. sch. (£60,450); new Romford Harold Hill inf. sch. at L.C.C. estate site No. 6 (£60,400); and new West Ockendon prim. sch. (£95,650). Plans by Cty. A.'s Dept. (H. Conolly, F.R.I.B.A.), County Hall, Chelmsford.

Gateshead.—Heaton Foundry Co., Ltd., to extend factory at Team Valley Trading estate. Architect, C. S. Errington, 46, Grainger-st., Newcastle.

Halifax.—T.C. recommended to approve reconstruction of Salvation Army hostel, Carlton-st.—T.C. received M.O.T. approval for 'bus station, Cross Field, at £19,820.

Haslingden.—Housing Com. propose to erect eight houses on site adjoining Haslingden Ministry of Labour office.

Hereford.—E.C. approved plans by Scriven, Powell & James, L. & AA.R.I.B.A., Cathedral-chbrs., King-st., Hereford, for a laboratory and gymnasium for the Governors, Hereford Cathedral Sch.

Hull.—Governors of Hull University College have approved plans for first stage of large extensions between Cottingham-rd. and Inglemire-la., comprising a multi-storey Chemical Faculty Block. Architects, W. A. Forsyth & Partners, FF.R.I.B.A., 47, Nottingham-pl., W.1.

Hull.—New premises, Wassand-st., for Herman Pickles, Ltd., Billingsgate. Plans by R. A. Inglis, 191, High-st. North.

Hyde.—B.C. approved prim. sch., Knott-la., for Cheshire C.C.—B.C. approved plans for: 12 houses, Marlborough-rd., for F. Norgrove & Son.—Extensions to works, Croft-st., for J. Adamson & Co., Ltd.

Kidderminster.—Worcs. C.C. to extend fire stn., at £20,000.

Lancashire.—Ed. Com. have reserved a site of 2,720 sq. yd. to south of Edgemoor-dr., Thornton, for proposed nursery sch., for Crosby and Thornton.

Lancashire.—Ed. Com. propose to erect new Waterfoot nursery sch. at Top Barn-la. Est. cost, £28,000.

Lancs.—C.C. propose adaptation of Astley Isolation Hospital as a day special school.—To adapt "Elmhurst," Garstang, as home for 14-plus children (1951-2 programme). G. Noel Hill, Cty. A.

Leeds.—T.C. to prepare sketch plans for exhibition hall, junction of Marsh-la. and York-rd., at £250,000.

Leigh.—Southend Corpn. propose erection of new prm. sch. at Blenheim Chase, at £93,615.

Liverpool.—Housing Com. have approved appointment of Todd & Ledson as quantity surveyors in connection with scheme for 96 flats at Speke estate.

Manchester.—E.C. propose additional classrooms, Sacred Heart R.C. Sch.—T.C. approved plans for: 155 houses, 40 cottage flats and 24 3-storey flats and 88 "No Fines" houses at Northern Moor neighbourhood; 12 3-storey flats, Lawton Moor-rd., Northenden.

Manchester.—Reg. Hospital Brd. propose residential accommodation at Billinge Hospital, at £13,950.

Manchester.—Minister approved proposals for erection of 22 staff houses at Brockhall, at £25,303.

Middlesbrough.—Alterations are proposed to therapy dept. at North Ormesby Hospital, Cromwell-st., for Newcastle Hospital Brd. (architects, Garbutt Archibald & Archibald, Albert-rd., Middlesbrough).—Kitching & Co., 21, Albert-rd., Middlesbrough, are architects for a school and youth centre in Park-rd. South, for Hebrew congregation.—John Sinclair, Ltd., tobacco manufacturer, Newcastle-on-Tyne, propose warehouse, store, garage and offices at Bridge-st. West (architects, J. Walton Taylor & Son, St. James'-bldgs., Gallowgate, Newcastle-on-Tyne).—Plans have been approved for a police section house at Acklam-rd., for T.C. (plans by J. A. Kenyon, Boro' E.).—Plans by Boro' E. for batches of 94, 172 and 198 houses on Berwick Hills estate, for T.C., have also been approved.

Newbridge.—Sir Percy Thomas, PP.R.I.B.A., 10, Cathedral-rd., Cardiff, has designed a new Methodist Church, at an est. cost of £13,500, which is to be erected at Newbridge.

Newbridge (Monmouthshire).—Methodist authorities propose new church, at £13,500.

Newcastle-on-Tyne.—E.C. has submitted to M.E. sketch plans for proposed Denton-sq. prim. sch. (architect, C. S. Errington, 46, Grainger-st., Newcastle).—Thomas Barrett, Sons & Partners, 127, New Bridge-st., Newcastle, have been appointed quantity surveyors by E.C. for proposed Rutherford Grammar sch, (consultant engineers for the work are Cairns & Byles, 21, Ellison-pl., Newcastle).—R. W. Gregory & Partners, Pilgrim House, Newcastle, have been appointed heating and lighting engineers for proposed Stocksfield-av prim. sch., for E.C. (architects, P. L. Browne, Son & Harding, Pearl-bldgs., Northumberland-st., Newcastle).

Newcastle-on-Tyne. — Marshall & Tweedy, Grainger House, Blackett-st., Newcastle, have prepared plans for 8 houses near Freeman-rd., for Wilkinson Brothers, builders, Pillars Yard, High-st., Gateshead.—T.C. to build a children's foster home on Montague estate to plans by City A., 12, Cloth Market, Newcastle.—Plans have also been prepared by City A. for converting "Adderstone House," Adderstone-cres., into home for aged.—James Deuchar, Ltd., Eldon-sq., Newcastle, have received permission to convert premises at junction of Lonsdale-ter. and Lyndhurst-ave., Jesmond, into temporary hotel. (Firm's architect, S. H. Lawson, Emerson-chbrs., Newcastle.)

Newcastle (Staffs).—Marshall & Tweedy, Grainger House, Blackett-st., Newcastle-upon-Tyne, are architects for extensions to business premises in Low Friar-st., for W. D. Marks, Ltd.

Newcastle (Staffs).—L. J. Couves & Partners, Carliol House, Newcastle-upon-Tyne, are architects for a workshop for F. Reynolds, The Crescent, Newcastle.—C. Solomon, St. Mary's-pl., Newcastle-upon-Tyne, is architect for 14 houses in Red Hall-dr., for J. T. Bell & Sons, builders, Newcastle.

Newcastle-under-Lyme. — Licensing Magistrates approved conversion of Clayton Lodge, Clayton, as residential hotel, for Holts Brewery Co., Ltd. (Architect, C. J. Richard, 63, St. Georges-ave., Wolstanton, Staffs).—B.C. approved plans for: Extensions, Lower Milehouse-la., for Risto Wires & Cables, Ltd.—12 houses, Lunt-st., May Bank, for Phillips Bros., Ltd.—Church, for St. Michael & All Angels P.C. Council, Cross Heath.—Extensions to Newcast Foundry, Silverdale.—Reconstruction of Bat Houses, Knutton Tileries, for G. H. Downing & Co.—Offices, workshop and garage, Prospect-ter., for Hennessey Bros.—Dressing shop, Orford-st., Longport, for Jesshope (Engineers), Ltd.—14 houses, Stratford-ave., May Bank, for Baddeley Bros.

Newcastle-upon-Tyne.—Alterations to be made to premises of Spicers, Ltd., Hanover-sq. Architect, J. Angus, 21, Lovaine-pl., Newcastle.—Alterations to be made to King's College premises in Kensington-ter. Plans by Turley & Williamson, 14, Eldon-pl., Newcastle.—Premises in Eldon-sq. are to be converted into offices for Peat, Marwick, Mitchell & Co. Architects, Cackett, Burns Dick & McKellar, 21, Ellison-pl., Newcastle.

Northampton.—Bassett-Lowke, Ltd., model engineers, St. Andrew's-st., have acquired large site on Dallington Fields Industrial estate for new factory, offices, etc. Architects, Sir John Brown, A. E. Henson & Partners, 30, Billing-rd., Northampton.

Northumberland.—E.C. has approved sketch plans by Cty. A., County Hall, Newcastle-upon-Tyne, for proposed Ovington New Cty. Mod. Sch. (cost will be £141,000, including £109,000 for building works).

Northumberland.—C.C. has received sanction to spend £160,000 on first part of scheme for new tech. college at Ashington.

Nottingham.—C. F. W. Haseldine, F.R.I.B.A., Halifax House, Milton-st., Nottingham, is architect for new centre to be erected at Triumph-rd., for Nottinghamshire Territorial and Auxiliary Forces Association.

Oldham.—N.W. Gas Brd. propose extensions to Higginshaw Gas Works.—B.C. propose new crematorium at Hollinwood, at £20,000. Architects, Rothwell & Sanger, Yorkshire-st., Oldham.

Oldham.—Housing sub-com. have received loan sanction for £184,000 from Ministry of Local Government and Planning for erection of 132 houses and 8 bungalows at Filton Hill.

Oldham.—T.C. to prepare preliminary plans for new schools at Alt & Holt.—Propose erection of a new abattoir.—Approved plans for: Extensions, "West End" Ironworks, Middleton-rd., for Joseph Toole, Ltd.—Extensions to factory and canteen, Elliot-st., for Boden Davis, Ltd.

Penrith.—U.D.C. is negotiating a price with John Laing & Sons, builders, Dalston-rd., Carlisle, for erection of houses, Holmeriggs-ave.

Plymouth.—Y.W.C.A. propose to rebuild hostel and social club, 9-10, Lockyer-st. Architect, H. J. Hammick, L.R.I.B.A., 21, Alma-rd., Plymouth.

Portsmouth.—Leethams (Twilfit), Ltd., propose extensions to their factory, Milton. Architects, Thomas, Jolly & Grant, Coronation House, Portsmouth.

Rainford.—Pilkington Bros., Ltd., propose development of land at Higher-la.

Rawtenstall.—B.E. to seek permission to proceed with 'bus station, Queens-sq.

Reading.—Extensions costing about £40,000 are proposed by Reading & District Co-op. Society, Ltd., Cheapside, to their bakery premises. Architects, Sainsbury & Chamberlain, 14, Cross-st., Reading.

Repton.—R.D.C. to erect 20 houses, Findern.

Rhyl.—U.D.C. to proceed with alterations to open air swimming pool, at £10,000.

Rochdale.—B.C. approved plans for:—Offices at Mere-la., for Milne & Longbottom, Ltd.—Offices at Trafalgar Works, Bellfield-rd., for F. Greenwood & Sons, Ltd.—Alterations to offices at Weir-st., for

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Yelloway Motor Services, Ltd.—B.C. to invite tenders for improvements at Healey C. of E. Voluntary Controlled School, at £20,000.

Silsden.—U.D.C. propose further 82 houses, Dradishaw-rd. estate.

Smethwick.—Birmingham Reg. Hospital Brd. propose a neuro surgical unit at Isolation Hospital, at £60,000. D. A. Goldfinch, architect to Brd.

Staines.—Salvation Army to build two-storey hall and Sunday-sch., Kingston-rd. Plans by Chief A., W. H. Charles, L.R.I.B.A., 113, Queen Victoria-st., E.C.4.

Standish.—U.D.C. agreed to make application to borrow £36,140 for erection of 20 houses and 8 "Gregory" flats at Grove-la.

Stockton-on-Tees.—Layout plans by Boro' A., 28, The Square, Stockton, have been considered by T.C. for Portrack site. It is proposed to build 18 flats and a number of terrace houses.—Boro' A. has prepared plans for 24 houses on Albany estate. —T.C. has approved in principle proposed extensions, by means of hutments, at Hartburn Sch., and Boro' A. has been asked to prepare plans.—Durham City. T.A.A.F.A. are to erect houses, Roseberry-rd.—M. Trotter, 133, High-st., Stockton, has prepared plans for alterations to "Royal Hotel," High-st., for North-Eastern Breweries, Ltd.

Stretford.—B.C. approved plans for: 12 houses, 6 shops, with flats over, and 4 garages, Ripon-rd., for B.C.—Extensions to lab. and offices, Westinghouse-rd., for Metropolitan Vickers Electrical Co., Ltd.

Sunderland.—Corpn. to purchase 225 acres of land at Castletown as site for 1,800 houses. H. C. Bishop, Grange House, Stockton-rd., Sunderland, is Boro' A.

Swansea.—New war memorial chapel, St. Paul's Parish Church, Sketty. Plans by Cyril A. Hughes, L.R.I.B.A., 51, Walters-rd.

Todmorden.—B.C. approved plans for extensions to public library.

Weymouth.—South-West Metropolitan Reg. Hospital Brd., 11a, Portland-pl., W.1, to build new outpatients' dept., Weymouth and District Hospital, Melcombe-ave., and new physiotherapy dept., Portway Hospital, Wyke-rd., costing £10,000. Architect is L. Magnus Austin, F.R.I.B.A., 51, Towngate-st., Poole. Quantity surveyor is Irving Todd, F.R.I.C.S., Bush House, Christchurch-rd., Bournemouth.

Whiston.—R.D.C. to erect 102 houses, Pottery-la.

Windsor.—R.D.C. have approved plans for 54 flats at Bedford.

Workington.—B.C. propose conversion of Workington Hall as a town hall.

Worthing.—Lloyds Bank, Ltd., Lombard-st., E.C.3, propose to make alterations and improvements to their branch premises, South-st. Architects, Goldsmith & Pennells, 13, Liverpool-gdns., Worthing.

Worthing.—Plans prepared for block of 5 shops, 4 flats, garages and office, Chesterfield-rd., and The Causeway, costing about £20,000. Architects are S. C. Phillips & Kirk, 32, Chapel-rd.

TENDERS

* Denotes *accepted*.
† Denotes *provisionally accepted*.
‡ Denotes *recommended for acceptance*.
§ Denotes *accepted subject to modification*.
¶ Denotes *accepted by H.M. Government Departments*.

Aberdare.—Pithead baths, canteens, cycle parks, etc., Towers No. 1 and No. 4 Collieries, Hirwaun, for National Miners' Joint Welfare Council. William Traylor, F.R.I.B.A., divisional architect, National Coal Board (South-Western Division), Cambrian-bldgs., Mount Stuart-sq., Cardiff: *Amalgamated Building Contractors, Ltd., 1, Wandsworth-rd., S.W.8 (cost, about £150,000).

Acton.—54 flats on Oldfield estate site, for T.C.: *C. F. Kearley, Ltd., £87,956.

Amlwch.—Factory for Associated Ethyl, Ltd.: *Marples Ridgway & Partners, Ltd., London (cost approx. £2,000,000).

Atcham.—Four houses at Pontesbury, for R.D.C.: *W. Higley & Sons, Pride Hill-chbrs., Shrewsbury, £5,986.

Barnes.—14 flats and bungalows at Kingsway site, for B.C.: *A. Watson & Co., Ltd., £12,985.

Barrow-in-Furness.—Six police houses at Black Butts-la., Walney Island, for B.C.: *Direct Labour, £11,225.

Billingham-on-Tees.—30 houses in Roseberry-rd., for U.D.C. Architects, Kitching & Co., 21, Albert-rd., Middlesbrough: *C. J. Boyd, Ltd., Emmerson-st., Middlesbrough.

Birmingham.—New home for nursing sisters, Dudley-rd. Hospital, for Regional Hospital Board. Martin, Martin & W. H. Ward, FF.R.I.B.A., architects, 106, Colmore-row, Birmingham 1. Rider Hunt & Partners, quantity surveyors, Bridge House, Queen Victoria-st., E.C.4: *Maddocks & Walford, Ltd., Tyburn-rd., Birmingham 24, £135,719.

Birmingham.—Works for E.C.:—School clinic at Warren Farm-rd.: *A. Pearce & Sons, Ltd., Victoria-st., £11,188; infants' assembly hall and admin. rooms at Four Dwellings primary school: *P. W. Cox, Ltd., Grove-la., Birmingham, £7,100; four additional classrooms at World's End-la. primary school: *J. R. Deacon, Ltd., Lombard-st., Lichfield, £13,472; extensions at Silvermere school: *A. Pearce & Son, Ltd., £14,498; adaptations at Beckleton Court: *Treasure & Son, Ltd., £9,641. (All of Birmingham.)

Blackpool.—18 houses and four flats at Mereside, for T.C.: *Clifton Construction Co., Ltd., Clifton-rd., Blackpool, £28,893.

Bradford.—20 "Derwent" type houses at Harrogate-rd., Eccleshill, for T.C.: ‡T. A. Rae, Bradford, £26,040.

Brierley Hill.—Houses for U.D.C.: *Claude Burkes, Ltd., Halesowen, £28,444 (24); *P. W. Cox, Ltd., Grove-la., Birmingham, £106,954 (90).

Bristol.—Nine-storey office building, Gaunt's House, Denmark-st., for Pearl Assurance Co., Ltd., High Holborn, W.C.1. Alec F. French, F.R.I.B.A., architect, Halifax House, St. Augustine's-par., Bristol 1: *William Cowlin & Sons, Ltd., Stratton-st., Bristol.

Carlton.—28 flats at Cross-st. site, for U.D.C.: *W. Westerman, Ltd., 158, Bye-Pass-rd., Chilwell, £24,937.

Darlington.—Factory alterations on Aycliffe trading estate, for East Anglia Chemical Co., Ltd. Architects, Cordingley & McIntyre, The College, Durham: *Holland & Hannen and Cubitts, Wallsend.

Derby.—78 flats at Mackworth estate, for B.C.: *G. Wimpey & Co., Ltd., London, £86,113.

Doncaster.—Construction of a day nursery at Stanley House, Tickhill-rd., for C.B. B.E., 2, Priory-pl., Doncaster: *Walter Firth, Ltd., Armthorpe-rd., Doncaster.

Doncaster.—Dwellings at Cantley estate, for T.C.: *T. E. Wright (10 bungalows); *Pearson, Snow & Co., Ltd. (six houses); *Hemsworth Bros., Ltd. (four houses). (All of Doncaster.)

Durham.—Construction of 123 houses at Bowburn and the roads and sewers for 132 houses at Bearpark, for R.D.C. Surveyor, K. G. Miller, Byland Lodge, Durham: *Direct Labour.

Edinburgh.—New pathology and bacteriological department at the University's Teviot-rd. Medical Block. Mr. John Hamilton, Master of Work, The University-bldgs., Chambers-st., Edinburgh: *William Gerrard & Sons, Ltd., Wheatfield, Edinburgh.

Edinburgh.—Central library for the Carnegie United Kingdom Trust, to be erected at Fishers-ci., The Lawnmarket. James Shearer & Annand, F.R.I.B.A. 11, Maygate, Dunfermline, Fife: *John Crow & Son, Edinburgh.

East Kilbride.—Additions to the primary school. Mr. William Watt, F.R.I.B.A., architect, County-chbrs., Albert-rd., Motherwell, Wishaw. Excavation, brick, joinery, carpentry and allied works: *Samuel B. Allison, Ltd., Dennistoun, Glasgow; heating installation and engineering: *Direct Labour; electrical fittings and installation: *Small & MacDonald, Ltd., Glasgow.

Glasgow.—Alterations to the Lumsden Residential School, for T.C. John MacNab, F.R.I.B.A., architect, 129, Bath-st., Glasgow, W.C.2: *William Muirhead & Co., Glasgow, £5,934.

Hackney.—Nine houses at Lenthall-rd. housing site, for B.C.: *Direct Labour, £14,450.

Hackney.—Nine houses at Almack-rd. housing site, for B.C.: *Direct Labour, £14,440.

Kidderminster.—11 staff cottages, Lea Castle Colony, for Birmingham Regional Hospital Board. D. A. Goldfinch, F.R.I.B.A., chief architect: *H. Lee Bros., Ltd., Bolton Works, The Crescent, Birmingham 19, £21,231.

Leeds.—322 non-traditional houses at Swinnow, Tinshill, and Moorside, for C.C.: *William Airey & Sons (Leeds), Ltd., Eldon House, Leeds 2, £413,382.

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London.—Reconstruction as omnibus garage of New Cross tram depot, S.E., for London Transport Executive. James M. Monro & Son, architects, 32, Clarendon-rd., Watford. Currie & Brown quantity surveyors, 32, Clarendon-rd., Watford: *Wilson Lovatt & Sons, Ltd., 27, Ashley-gdns., S.W.1 (cost about £300,000).

London.—Two three-storey warehouses, Rum Quay West India Docks, E., for Port of London Authority. W. D. Shepperd-Barron, M.Inst.C.E., Chief Engineer, Trinity House, E.C.3: *John Mowlem & Co., Ltd., 91, Ebury Bridge-rd., S.W.1 (cost between £250,000 and £300,000).

London.—Hostel and club dining-hall, kitchen, etc., Fitzroy-sq. and Fitzroy-st., W.1, for Indian Students' Union and Hostel Committee. Ralph Tubbs, A.R.I.B.A., architect, 35, Welbeck-st., W.1. B. G. Coffin, F.R.I.C.S., quantity surveyor, 25, Victoria-st., S.W.1: *Tersons, Ltd., 1, Seward-st., Finsbury, E.C.1 (cost about £75,000).

London.—Rebuilding of factory, Colindeep-la., Hendon, N.W.9, for Everett Edgcumbe & Co., Ltd. V. J. Wenning, L.R.I.B.A., architect, 43, Doughty-st., W.C.1: *Howard Farrow, Ltd., 1, Russell-par., Golders Green, N.W.11.

¶London (Air Ministry).—Contracts to value of £500 or over for week ended March 31:—

Building work: Wm. Sindall, Cambridge; Henry Boot & Sons, Ltd., Sheffield. *Painting work*: Arnold Sharrocks, Ltd., Rochdale, Lancs; Wm. Herd & Co., Ltd., London, E.C.2; Dudley Coles, Plymouth; M. A. Appleton (Contractors), Ltd., Wolverhampton; Geo. Jones & Son, Ltd., Liverpool; Clark & Fenn, Ltd., London, S.W.4. *Resurfacing work*: Tarmac, Ltd., Wolverhampton.

General maintenance work: Geo. Shears & Sons, Ltd., Bournemouth; W. S. Try, Ltd., Uxbridge; Beric, Ltd., Christchurch; Kerridge (Cambridge), Ltd., Cambridge; Loakes & Pettit, Ltd., Thrapston, Northants; E. B. Smith (Croydon), Ltd., Croydon; F. C. White, Ltd., Boscombe; E. Corben & Son, Ltd., Southampton; F. & D. Lucas, Salisbury; W. & J. Glossop, Ltd., York; M. & F. C. Foster & Co., Ltd., Hitchin, Herts; J. M. Jones & Sons (Bldrs.), Ltd., Maidenhead; Wm. Sindall, Cambridge; J. T. Barber & Son, Boston; F. Shepherd & Son, Ltd., York; S. Cronin & Sons, Ltd., Brentwood, Essex. *Dismantling and re-erection of hangar*: West Midlands Erection Co., Ltd., Willenhall, Staffs.

London (British Railways).—British Railways (London Midland Region) announce that the following railway contracts have been placed:—

Additional marshalling and carriage siding accommodation at Willesden sidings, Caffin & Co., Ltd., 25, Craven-st., London, W.C.1. Renewal of the roof covering, with patent glazing, of Saltley carriage shed, W. H. Heywood & Co., Ltd., 54, Victoria-st., Westminster, S.W.1. Renewal of the roof, pits and pavings at Bescot motive power depot, Edward Wood & Sons, Ltd., of 70, Park-st., Derby. Roof sheeting at Wolverhampton carriage and wagon works, Robertson Building Service, Wolverhampton Corrugated Iron Co., Ltd., Ellesmere Port, Wirral, Cheshire. Relining of the North Chimney, Stonebridge Park power station, Topping & Leggatt, 13, Old Park-rd., Palmers Green, London, N.13.

¶London (M.O.W.).—Contracts placed by M.O.W. during week ended March 31:—

London: Ariel House, Theobalds-rd., W.C.1, Internal decorations, Deora, Ltd., 11, Hanbury-rd., Acton, W.3. *Berkshire*: Crowthorne, Erection of telephone exchange, E. C. Hughes, Ltd., Albion Works, Wokingham. *Essex*: Rippleway, Barking, Erection of new automatic telephone exchange, Hammond & Miles, Ltd., Scrafton-rd. Works, Ilford. *Hampshire*: Tidworth Barracks, Tidworth, Demolition of barracks and erection of workers' camp, Richard Costain, Ltd., Dolphin-sq., London, S.W.1. *Lancashire*: Egerton-cres., Withington, Manchester, Erection of sub-post office, Unit Construction Co., Ltd., 21a, Brook-st., Knutsford, Cheshire.

¶London (War Dept.).—Contracts placed by W.D. during week ended March 31:—

Roxburghshire: Miscellaneous, Preston Parker & Co., Ltd., Edinburgh. *Morayshire*: Miscellaneous, James Johnston, Elgin. *Lancs*: Miscellaneous, B. G. Roberts & Co., Ltd., Preston. *Flintshire*: Building, Gorst Bros., Abergele. *Northumberland*: Building (concrete work), George Henderson, East Boldon. *Leicestershire*: Miscellaneous, Bradshaw Bros. (Contractor), Ltd., Leicester.

Yorks: Painting (two contracts), W. T. Pickering & Sons, Ltd., Stockton. *Essex*: Building, Hosking & Son (Essex), Ltd., Rayleigh; Building (concrete works), Thos. Bates & Son, Ltd., Romford. *Kent*: Miscellaneous, C. I. Epps & Son, Ltd., Ashford, Kent. *Sussex*: Painting, C. & T. Painters, Ltd., London, N.W.10; Miscellaneous, W. H. Bensted & Son (Contractors), Ltd., Maidstone.

Kent: Roofing, Haywards, Ltd., London, S.E.1. *Devon*: Dismantling, removal and re-erection, Devon Contractors, Ltd., Exeter. *Hants*: Miscellaneous, E. J. Logan (Putney), Ltd., London, S.W.15. *Wilts*: F. Box & Sons (Bournemouth), Ltd., Bournemouth; Building alterations, R. C. Radford, Farnham.

Loughton.—New omnibus garage for London Transport Executive. Yorke, Rosenberg & Mardall, architects, 2, Hyde Park-pl., Marble Arch, W.1. Cyril Sweett, F.R.I.C.S., quantity surveyor, 17, Holborn-viaduct, E.C.1: *Gee, Walker & Slater, Ltd., 100 Park-la., W.1.

Manchester.—Operating theatre and X-ray department at Prestwich Hospital, for Regional Hospital Board: *A. Bradshaw, Ltd., 448, Bury New-rd., Prestwich, Manchester. £16,593.

Manchester.—Works for T.C. :—Nursery win at Charlestown school, Blackeley: *Henry Green & Sons (Builders), Ltd., Manchester; extensions to machine shop at Openshaw tech. school: *Henry Green & Sons (Builders), Ltd.; additional classrooms at Peacock-st. school: *Robert Street & Co. (Salford), Ltd.

Pre-fab. classrooms at St. Robert's R.C. school: *J. E. Stephenson & Co., Ltd., Manchester; alterations and adaptations at "Four Acres," Four Acres-rd., Wythenshawe: *Mitchell & Cotsworth, Ltd., Manchester; public conveniences at Hollyhedge-rd., Wythenshawe: *Robert Street & Co. (Salford), Ltd.; 44 houses (Contract 126) at Northern Moor: *J. C. Darley, Ltd., Manchester.

27 houses (Contract 129) at Mendip-av., 16 (Contract 124) at Crossacres-rd., and two at Hollyhedge-rd. All at Crossacres. 80 houses (Contract 122) and 30 flats (Contract 106a) at Newall Green: *Direct Labour.

Morpeth.—10 houses at Mitford, for R.D.C.: *Graham & Mansforth, 454, Denton-rd., Lemington-on-Tyne, £13,898.

Oldham.—Extensions at Alexandra Park infants' school, for E.C.: *Whitworth Whittaker, Ltd., Oldham; new maintenance depot at Limeside estate: *Haldean Building Co., Ltd., Oldham.

Paddington.—12 flats at Queen's Park Court (Block "B"), for B.C.: *Holloway Bros. (London), Ltd., £21,689.

Scottish Special Housing Association, Ltd.—Contracts placed between February 21 and March 20.

Site Servicing.

Gateside, Douglas (188 Atholl): Shanks & McEwan, Ltd., 45, Renfield-st., Glasgow, Drainage. Rigside, Douglas (26 Trad.): James Waddell & Son, 50/52, Flowerhill-st., Airdrie, Drainage.

House Erection.

Todlarknap, Drumtochty (1 Trad.): Burness & Son, 10/14, Murray-st., Montrose, All Trades. Kinlochard, Perthshire (12 Trad.): John Montgomery, Gartmore, Stirlingshire, Painter. Borestone, Stirling (26 Trad.): George Riddell, Roseburn-st., Edinburgh, Slater and roughcast. Niddrie Marischal, Edinburgh (80 Cruden): Scottish Gas Board, 15, Calton-hill, Edinburgh, Gas Services.

West End, Fraserburgh (32 Miller): North of Scotland Hydro Electric Board, Elgin, Electricity services. Crosshill & Meadows, Campbeltown (50 B.I.S.F.); Barnet & Morton, Ltd., 196, High-st., Kirkcaldy, Front fencing. Kinlochard, Perthshire (12 Trad.): R. W. Macdonald, 17, Pearl-st., Callander, Plaster and cement.

Valley-gdns., Kirkcaldy (122 Trad.): John Reid & Son, Crossgates, Fife, Joiner; A. Thomson & Co. (Plumbers), Ltd., 41, Inglis-st., Dunfermline, Gas fitter and plumber; Anthony Galloway, Halbeath-rd., Dunfermline, Plaster; Peter Kelly & Sons, Ltd., 33, Brunswick-rd., Tiler and roughcast; James Thow, Ltd., 33, George-st., Ayr, Glazier; Neil Nicholson, 12, Whitehouse-ave., Kirkcaldy, Painter; Boyne, Smith & Wylie, 20/22, Nelson-st., Edinburgh, Electrical.

Aberfoyle, Perthshire (31 Trad.): Wm. Gibson & Co. (Builders), Ltd., St. James-st., Paisley, Excavator, brick and joiner. Sighthill, Edinburgh (2 Orlit): Scottish Orlit Co., Ltd., 79, George-st., Edinburgh, All trades. Valley-gdns., Kirkcaldy (122 Trad.): Wm. Arnott McLeod & Co., Ltd., Russel-rd., Edinburgh, Mason and Brick. Neilsland-rd., Hamilton (62 Weir): Weir Housing Corporation, Ltd., Calder-st., Coatbridge, All Trades.

Carskeoch, Patna (80 Weir, 72 Atholl): S.-W. Scotland Electricity Board, Greenholm-st., Kilmarnock, Electricity services. Lane Farm, Drongan (100 Weir): S.-W. Scotland Electricity Board, Greenholm-st., Kilmarnock, Electricity services. Garthdee West, Aberdeen (330 W/Fairhurst-Orlit): Alexander & Son, Sunbury-mews, Belford-rd., Edinburgh. Handrails.

Auchenback, Barrhead (54 Miller): Scottish Gas Board, Barrhead, Gas Services. Cuiken Burn, Penicuik (90 Cruden): Northern Sports Ground Construction Co., Edinburgh, Handrails. Stoneyburn, Midlothian (56 No-Fines): Scottish Gas Board, Chester-st., Edinburgh, Gas services. Toryglen, Glasgow (260 Trad.): McCulloch & Giffen, Ltd., 47, Rose-st., Glasgow, Plumber.

Forehill-rd., Ayr (66 houses), S.W. Scotland, Electricity Board, Kilmarnock, Electrical services. Cuiken Burn, Penicuik (44 Weir; 56 Cruden): Geddes & Springthorpe, Edinburgh, Stockproof fencing. Woodwynd, Kilwinning (58 Trad. and part of 8 Trad.): Wm. Rowe, 8, Glasgow Vennel, Irvine, Plumber.

Southend-on-Sea.—Primary school at Blenheim Chase, for C.B. Frank W. Smith, A.R.I.B.A., Architect to Education Committee, 30, Alexandra-st Quantities by Widnell & Trollope, Broadway Court, Broadway, Westminster, S.W.1: *A. J. Arnold, Ltd., 8, Kingsway, Westcliff-on-Sea, £93,615.

Stafford.—26 houses for B.C.: *Wm. Whittingham, Ltd., Powlett-st., Wolverhampton, £34,306.

Stoke Newington.—15 shops with 15 maisonettes above, 12 garages and six pram sheds at Woodberry Down estate, for L.C.C. housing committee: Sloggetts (Contractors), Ltd., Kensington, £63,227.

Stretford.—84 flats for B.C., at Christie-rd. site: *Humphrey Park Estates, Ltd., Urmston, £39,106 (two blocks); *C. H. Godfrey & Son, Ltd., Manchester, £25,960 (two blocks); *Lionel Gray (1933), Ltd., Farnworth, £26,292 (two blocks).

Wellingborough.—10 houses at Queen's-rd., Wollaston, for R.D.C.: *A. Underwood, York-rd., Wollaston, £13,009.

West Bromwich.—Erection of Hamstead c.p. school, for E.C.: *C. Green & Sons, Ltd., 132, Monument-rd., Birmingham.

West Riding.—Extensions and completion of Ecclesfield Colley sec. school, for C.C.: *Henry Boot & Sons, Ltd., Eccleshall-rd. South, Sheffield.

Whiston.—30 houses at Longton-la., Rainhill, for R.D.C.: *E. Henshaw, Freckleton-rd., St. Helens, £36,753.

Wigan.—12 houses at Gathurst-la., Shevington, for R.D.C.: *Leonard Dickinson, Ltd., Upholland, £14,209.

Woking.—40 houses at Maybury estate, for U.D.C. Architect, H. P. Tame, A.M.I.C.E., M.T.P.I., Reg. Arch., E. & S. Quantities by J. McBain & Partners:—

E. Clarke & Sons, Ltd., Addlestone ...	£55,751
A. & J. Simmons, Ltd., Woking	53,969
T. Higgs & Co., Ltd., Woking	53,236
E. P. Wickens & Sons, Ltd., Addlestone ...	52,705
*H. Beasley & Sons, Staines	52,696

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